TORREYA

A BI-MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

John Torrey, 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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TORREYA

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January-February, 1928

THE PERIOD OF ANTHESIS IN HIBISCUS

Alexander F. Skutch and Robert L. Burwell, Jr

A small fresh-water marsh, separated by a narrow, wooded neck of sandy soil from the brackish waters of the estuarine Severn River on the western shore of Maryland, was from late July until mid September bright with the showy blossoms of hibiscus. Growing side by side in the oozy, black soil were plants which produced flowers of four different color combinations. The crimson-eyed hibiscus (*Hibiscus oculiroseus* Britton), named from the crimson patch in the center of the large, white corolla, was present in the greatest abundance. Scattered among this grew a hibiscus with a delicately rose-tinted corolla, the swamp rose-mallow (*H. Moscheutos* L.). In addition to these were plants which produced flowers with pure white corollas, and others the petals of which had the rose tint of the rose-mallow, except for the crimson eye of *H. oculiroseus* at the center of the flower. The plants which bore these four distinct types of blossoms could not be distinguished in the field by vegetative characters, and the only obvious difference between the flowers was in the color of the petals, which in all of the forms were 8–9 cm. long. Bailey* considers it probable that *H. oculiroseus* is a variety of *H. Moscheutos*. The other types may possibly be hybrids between the two more common forms which have been given specific rank.

The blossoms of hibiscus are among the largest in our native flora, and for this reason their diurnal periodicity is very spectacular. If in the evening we mark in some fashion the largest flower buds of one of these swamp hibisci, choosing only those of which the convolute corolla projects beyond the partially opened calyx, we shall find that most, if not all, of them will open on the following morning. In mid August, by 7:30 or 8 A. M. they have unfolded to practically their fullest extent. During the

* Bailey, L. H. Manual of Cultivated Plants. New York, 1924.

day they are visited by bees and occasional butterflies, among which the silver-spotted skipper (*Epagyreus tityrus* Fabr.) is prominent. By four in the afternoon the corollas have closed perceptibly, and by six they are almost completely folded. These flowers will not open on the following morning, but bloom during a single day only. Their period of full bloom is nine hours or less. Out of fifteen flowers which had been marked, three shed the furled corollas on the day after blooming, while most of the remainder fell during the following night, the second since their anthesis.

If the pollination of the flowers is prevented, the behavior of the corollas is quite different from that sketched above. At 9 P. M. on August 12, eight large buds were enclosed in mosquito netting bags, and of these, seven were in full bloom at noon on the following day. They did not close that evening along with the unprotected flowers, but remained open during the entire night of August 13–14. At 10 A. M. on August 14 four of the bags were removed and pollen was transferred on a small brush to the stigmas of these flowers, while the remaining three were left inside the bags to serve as controls. On the evening of the same day the artificially pollinated flowers, which had been open continuously for about thirty-two hours, closed along with the undisturbed, insect-pollinated flowers which had come into bloom that same morning. The unpollinated flowers were still open on the following day.

The normal behavior of the flowers of the shrubby althaea (*H. syriacus* L.) of our hedgerows and flower gardens is practically the same as that of the swamp hibisci. Each blossom remains open but a single day. After closing the corollas generally remain attached to the receptable for a longer period than in the case of the marsh-inhabiting species, and often dry up over the pod instead of falling while still fresh. The corolla of *H. Trionum* L., aptly called the flower-of-an-hour, has normally, according to Kerner,* a period of bloom of about three hours, which makes it the most ephemeral of all the species recorded in this author's table of duration of anthesis.

The difference between the pollinated and the unpollinated flowers of hibiscus raises a question in regard to the above-

* Kerner von Marilaun, Anton, The Natural History of Plants, trans. by F. W. Oliver. New York, 1895. See half-volume III, p. 213.

mentioned table in Kerner's "Pflanzenleben," and indeed to observations on the period of anthesis as far back as the famous "floral clock" of Linnaeus. In compiling this list no attention seems to have been given to the time which elapsed between the beginning of anthesis and pollination, and no distiction was made between pollinated and unpollinated flowers. Thus for native European species, most of which would be accessible to their normal insect visitors, a short period of anthesis is as a rule recorded, while the exotic orchids are credited with periods of several weeks—60 days in the case of *Oncidium cruentum*, 70 for *Cypripedium villosum*, 80 for *Odontoglossum Rossii*, etc. We know from the work of Fitting* that the corollas of orchids (at least those which do not turn green after fertilization) fall very soon after pollination, and this irrespective of the period which has elapsed since they first came into flower. Hence we may safely assume that the orchids for which Kerner records the long periods had not been pollinated. The problem of how the presence of the pollen affects the corolla, often at a considerable distance, has not been solved. We know from much recent work that stimuli are transmitted through the plant body by means of hormones, which either diffuse through the tissues, or are more rapidly carried in the transpiration stream. However, there is at present no conclusive evidence that such plant hormones are active in bringing about postfloration changes in flowers, although we may assume this to be the case.

A morphological peculiarity worthy of notice in *H. Moscheutos* and some allied species is the elevation of the leaf-like bracts upon the pedicels which are axillary to them. In other words, the leaf, which is normally situated upon the main stem, and from the axil of which the pedicel springs, appears in the examples in question to grow from the lower side of the pedicel at a considerable distance from the stem. There is great variability in regard to this feature even between the different pedicels of the same inflorescence. In some the bracts are situated upon the main axis in the normal position, while in others they are seated upon the pedicel 2 cm. above its connection with the stem, and all intermediate conditions occur. A similar situation may be observed with more regularity in the water pimpernel (*Samolus*

* Fitting, Hans, Die Beeinflussung der Orchideenblüten durch die Bestäubung und durch andere Umstände. Zeitschrift für Botanik, Bd. I, S. 1, 1909.

floribundus H. B. K.), which grows close by hibiscus on the shores of the Severn. In such cases the botanical rule that branches are axillary to leaves is not departed from so flagrantly as appears at first sight. It is usually found that early in its development

FIGURE 1. A portion of the hibiscus swamp at noon, August 10, 1927. At the left are two flowers of the crimson-eyed hibiscus in full bloom. To the right are several blossoms of the variety with pure white corollas. Just below the center of the figure is a drooping, closed corolla which had been open the previous day.

the branch is actually in the axil, but elongation sets in at the base of both bract and pedicel, where the two are in contact. As this region where they are united increases in length, the bract is borne away from the stem until it appears to spring directly from the pedicel, but its basal continuation may often be followed down the pedicel to the main axis.

THE JOHNS HOPKINS UNIVERSITY,
BALTIMORE, MD.

A NEW DEERBERRY FROM THE GULF REGION

JOHN K. SMALL

In the course of two excursions across the southern parts of the eastern Gulf States a peculiar-looking deerberry (*Polycodium*) was frequently observed growing on the hills from western Florida to Louisiana. The plants or colonies were always less than knee-high. They comprised short erect foliage and floral branches, the former evidently the floral branches of the succeeding year. As this plant does not seem referable to any of the described species, it may be known as:—

Polycodium depressum Small, sp. nov. A shrub with several or many erect branches 1–3 dm. tall, the twigs, especially those of the leafy shoots closely fine-pubescent: leaves rather close together; blades elliptic or nearly so, individually sometimes broadly so, 2–5.5 cm. long: racemes spreading or ascending, mostly 4–7 cm. long, the rachis and pedicels copiously fine-pubescent: bracts only a fraction as large as the leaves, otherwise similar to them: hypanthium densely pale-pubescent: sepals ovate to triangular, nearly or quite 2 mm. long, obtuse or merely acute, pubescent: corolla white, about twice as long as the calyx; lobes deltoid to ovate-deltoid, slightly shorter than the tube, obtuse: stamens about 7 mm. long; filament pubescent; anther with slender tubular appendages fully twice as long as the sacs, the spur-like appendages about as long as the sacs: ovary glabrous: style subulate, glabrous: berry.

Pinelands, northern Florida to southern Louisiana.—Spring. Type from near Silverhill, Alabama, Small, Mosier, and Matthaus. —, May 3rd, 1926,

The low habit of this *Polycodium* separates it from all the other species of the genus. In the floral characters it is related to *Polycodium melanocarpum* and *P. macilentum*. The size of the flower is somewhat intermediate between those of these species. It differs from both in the obtuse or merely acute sepals.

NEW YORK BOTANICAL GARDEN.

A NEW CHAMAESYCE FROM THE FLORIDA KEYS

John K. Small

The oölite of the lower Florida Keys supports several endemic species of Chamaesyce, discovered there in the past decade. These are very sharply defined species with affiliations in the flora of the Bahamas, rather than in that of the Florida peninsula. An additional species is rather wide-spread in the pinelands of several of the islands. It may be named and described as follows:

Chamaesyce keyensis Small, sp. nov. Plant erect, the stem usually branched at the base and above, woody, like the branches, pale, sometimes gray, finely pale-pubescent, the branches strict, erect or nearly so, leafy: leaves opposite; blades elliptic-ovate to elliptic, oval, or ovate, 3–9 mm. long, obtuse, entire, minutely pubescent, especially beneath, rounded at the base, short-petioled: involucre turbinate, a little over 1 mm. long, stout-peduncled, finely pubescent; glands transversely elliptic, 0.5 mm. wide; appendages white or pinkish, about as wide as the glands, undulate or crenulate: capsule globose-reniform, about 2 mm. wide, finely pubescent: seed ovoid, nearly 1 mm. long, slightly transversely wrinkled.—Sand-dunes and pinelands, lower Florida Keys.

Like its closest relative, *Chamaesyce scoparia*, *C. keyensis* is an erect woody stemmed plant with numerous leaves. The leaves, however, are veiny and pubescent and not parchment-like and glabrous. The involucre is turbinate and pubescent instead of hemispheric-campanulate and glabrous, while the gland-appendages are not as long. The capsule is globose-reniform instead of globose-ovoid. The type specimen, from pinelands on No Name Key, Florida, in the herbarium of the New York Botanical Garden, was collected by John K. Small, February 4, 1926, *7439*.

New York Botanical Garden.

BOOK REVIEW

The Flora of the Chicago Area*

We have attained to a new standard in the publication of local floras. From the old-fashioned, dry-as-dust list of scientific

* An annotated flora of the Chicago area, with maps and many illustrations from photographs of topographic and plant features, by H. S. Pepoon, B.S., M.D., head instructor in botany and agriculture, Lake View High School. Pages xxii + 554. Published by the Chicago Academy of Sciences, 1927. $3.50.

names we have at last progressed to a graphically written, elegantly printed, beautifully illustrated flora, full of information for the professional botanist and equally replete with inspiration for the amateur. Surely the botanists of the Chicago region are to be envied on having available such a remarkable handbook, just as the author is to be complimented for its preparation and the Chicago Academy of Sciences for its publication.

The Chicago area has the shape of a broad crescent along the shore of Lake Michigan, which forms its eastern concave boundary. Its convex western and southern boundary leaves the shore near the Wisconsin-Illinois line and sweeps in a great curve through Elgin and Joliet, Illinois, and Crown Point, Indiana, again reaching the lake in the famous sand-dune country east of Gary. Its maximum dimensions are approximately thirty-five and eighty-five miles. The greater part of this area was occupied in early post-glacial time by Lake Chicago, and its western or southern boundary seldom passes far beyond the Valparaiso moraine. The area therefore does not coincide with any political division and is so diverse in its topography and physiography that it has been divided into six districts, each characterized by noteworthy differences in flora and vegetation.

No less than 134 pages are utilized for a discussion of the botanical features of these six regions. The discussion is primarily ecological in nature, but lacks the technical details of an ecological monograph, as a moment's comparison with the works of Cowles, Sherff, or Gates will show. This flora is not a monograph on ecology, however, and the non-technicality is a desideratum rather than a fault, while the graphic description of the vegetation is unusually clear and readable. This part is illustrated by six maps and by twenty-four full-page plates and seventeen smaller figures in half-tone, well chosen to present not only the leading aspects of the vegetation but attractive landscapes as well. Throughout this part the floristic and physical features of the region are correlated, and much additional information is given as to collecting localities, rare species, extinction of species, effects of urban development and agriculture, and other subjects of interest to the botanist. Considerable attention has been given to the need of wild-flower preservation, which must be urgent in a region of such extensive urban development.

The second part, including 385 pages, presents the flora of the

region, enumerating 53 ferns and fern-allies, 13 gymnosperms, 507 monocotyledons, and 1330 dicotyledons. This makes a total of 1903 forms, which may be either species, named varieties, or hybrids. Such a generously varied flora is obviously explained by the physical diversity of the region, in which prairies, forests, bogs, and dunes are well developed. Forty full-page plates and thirty-six figures illustrate as many species. The names accepted and used are those of Gray's Manual, but names according to the American Code are appended in every case where they differ, according to the treatment in the Illustrated Flora of Britton and Brown. Each species listed is accompanied by a brief statement of its habitat preferences and of some of its known stations. A feature of this part of the book is the keys to the families, genera, and species. These keys are ingeniously constructed to follow lines of least resistance, and should be very useful to amateurs who are interested in identifying their finds easily and quickly. They are not complete, however, stopping in difficult groups at the family, as the grasses and sedges, the genus, as *Solidago* and *Antennaria*, or a subgeneric group, as in *Polygonum*. A special key is provided for trees in their winter condition, illustrated by six plates showing twigs, buds, and leaf-scars. No distinction is made in typography between native and naturalized species and the text seldom makes their status clear. The largest families, with the number of forms for each, are Cruciferae, 61, Leguminosae, 76, Rosaceae, 94, Gramineae, 167, Cyperaceae, 183, and Compositae, 209.

A review is not complete without some attention to the defects of a book, no matter how heavily they may be outweighed by its virtues. Of typographical errors there are a few, such as *psychodes* for *psycodes* (p. 239) or Dycotyledons (p. 267). There are also a few inaccuracies of statement, such as terming the fruit of *Polygonum virginianum* a "bur-like contrivance" (p. 289). The accuracy of the taxonomic interpretation of the Chicago species is also open to question in a very few cases. Undoubtedly it is an advantage, for the purposes of the book, to refer the species to those recognized in the seventh edition of Gray's Manual, since that is followed in nomenclature and is evidently expected to serve as the standard reference for description. It is therefore preferable to know the wild yellow lily as *Lilium canadense* L. than to follow its recent segregation as L. *michiganense* Farwell.

On the other hand, to refer to a case with which the reviewer has some personal familiarity, there is no reason at all for the interpretation of the genus *Vernonia* to include *V. noveboracensis* and *V. glauca* in the Chicago area. And lastly, the reviewer, who has just returned unscathed from Cambridge, although completely without weapons of botanical offense or defense, must take exception to the attitude on page ix that the botanists of the country are divided nomenclatorially into two "more or less hostile groups." Differences of opinion and of procedure there are, certainly, but this can by no means be described as hostility, and it is regrettable that an amateur clientele should needlessly be given such an erroneous impression.

But the book as a whole is a fine production and a joy to look at, and it takes the reviewer back to his own botanizing expeditions over parts of the territory and pleasantly recalls his acquaintance with the author.

H. A. Gleason.

Two Recent Books on the Vegetation of Switzerland

American ecologists can get a good idea of the thorough way in which their Swiss colleagues undertake vegetational studies by a perusal of two valuable books recently issued as parts 14 and 15 of the Beiträge zur geobotanischen Landesaufnahme, published by the Phytogeographical Commission of the Schweizerische Naturforschende Gesellschaft under the editorship of Dr. E. Rübel. In the first* of these, 209 pages are devoted to a consideration of agricultural and forestal conditions over an area of about 430 square miles; in the second,† 760 pages are used for the description of the natural vegetation over an area of almost exactly 100 square miles. As a result any reader, no matter how slight his personal familiarity with Switzerland, inevitably feels that the descriptions must be trustworthy and accurate, as well as complete and detailed. Thousands of American tourists, many of them botanically inclined, have passed through these two areas, the one including the railway from the St. Gotthard tunnel north

* Oechslin, Max. Die Wald- und Wirtschaftsverhältnisse im Kanton Uri. 209 pages, 29 figures, map. Hans Huber, Bern, 1927. Price 24 francs.

† Gams, Helmut. Von den Follateres zur Dent de Morcles. xii + 760 pages, 100 figures, map. Hans Huber, Bern, 1927. Price 48 francs.

to the Lake of Lucerne and the high region around Andermatt, the other the valley of the Rhone north and east of its great bend at Martigny.

The first monograph, after describing the geography, geology, soils, and climate of Uri, proceeds to a dicussion of the forests, including their prehistoric or normal altitudinal limits, the present tree-line, the nine forest types (mostly coniferous), and the agricultural and industrial practices which are affecting the forests today. This is followed by a similar discussion of the pastures and meadows and of the comparatively limited areas of arable land.

The second monograph is more strictly botanical in nature. Nearly two hundred pages are used to describe the environment and the floristics of the region. The vegetation is then classified into groups based on the form or habits of the component species, the three chief divisions being the floating vegetation or plankton, the adnate vegetation of algae, mosses, and lichens, and the rooting vegetation. The latter is in turn divided essentially in accordance with Raunkiaer's well known principles into hydrophytia, helophytia, geophytia (including annuals and cultivated plants), hemicryptophytia (meadows and other herbaceous associations), chamaephytia (heaths), and phanerophytia (forests and shrub-associations). The monograph closes with about twenty pages discussing successional relations.

Both monographs are effectively illustrated and accompanied by maps of the vegetation on a scale of 1 to 50,000. These are superposed on the regular Swiss topographic maps, showing towns, roads, and contours, and so become a Baedeker for any botanical tourist in these parts of Switzerland.

H. A. Gleason.

Drewitt's Latin Names of Common Plants*

In the preface the author explains that the object of the book is "to get at a reasonable pronunciation of the Latin names of some familiar flowers and, when possible, their interesting derivations and history." After a short introduction giving the rules of Latin pronunciation, there are notes on the "name-givers,"—

* F. Dawtry Drewitt. Latin Names of Common Plants, their Pronunciation and History. 68 pages. H. F. & G. Witherby, London, 1927.

Dioscorides, Pliny and Linnaeus. Most of the book is occupied with a list of common cultivated flowers whose generic names are also the common names or are commonly used by gardeners. For each of these the correct pronunciation is discussed and some notes given as to the origin and meaning of the name. In most cases the pronunciation given is that commonly used by botanists, in a few cases they are different from those in use. Frequent references are made to Sargeaunt's Pronunciation of English Words derived from the Latin, to the New Oxford Dictionary and to the Imperial and Webster's Dictionaries. The names are not arranged alphabetically nor according to any system of classification, but a full index remedies what would otherwise be a serious defect.

As an indication of the pronunciations and of the clearness with which they are explained a few samples may be given:—"Chrysanthemum, the *y* is long as in cry, not short as in crystal." "Clematis—the popular pronunciation cannot be changed. But in the full Latin name the *e* might be emphasized, Cle′-matis." "Dahlia. In 1804 it was introduced into England by Lord Holland—Macaulay's Lord Holland. The writer has good authority for saying that at Holland House, the name was always given its correct pronunciation Darlea." "Heliotrope,—readers will probably agree that—in heliotrope *he* shall not be degraded into *hel.*" "Lilium, the letter *i* in the first syllable is long, and should be pronounced by those who use the classical pronunciation Lī-lium, not Lilly-um." "Rhus. The Latin name is Rhus, rhyming with *moose.*" Just what the need or value of such a book is it would be difficult to say. The number of plants listed, 69, is not sufficient to make it of value as a dictionary of plant names. But the references to origins of the names, the mythology, the remarks regarding habits or structures will surely give an hour or two of pleasure to all lovers of garden flowers. It is a friendly little book, well printed and simply bound in board covers, revealing throughout the author's affection for the plants.

G. T. Hastings.

MISS ANNIE LORENZ

The numerous friends of Miss Annie Lorenz were greatly shocked and grieved to learn last summer of her untimely death,

which occurred at Hartford, Connecticut, on June 11, in her forty-ninth year. Miss Lorenz had been a member of the Torrey Botanical Club since 1906. She was a member also of several other scientific organizations, such as the Vermont Botanical Club and the Connecticut Botanical Society, of the latter of which she had served as treasurer and recording secretary. In recognition of her work she had been made a fellow of The American Association for the Advancement of Science. Miss Lorenz was unusually versatile and accomplished. Besides being a keen and active botanist, she was a good draughtsman, a linguist, and a musician. Her impromptu song recitals and piano solos will be remembered with pleasure by many who attended field meetings of the Vermont Botanical Club and the Connecticut Botanical Society or who enjoyed the privilege of visiting her home.

Miss Lorenz's botanical interests developed very early. Possibly the summers spent in her young girlhood at Willoughby Lake, Vermont, where she came into the sphere of influence of Dr. George G. Kennedy and Mr. Edwin Faxon, had something to do with directing her attention to the treasures of the plant world. Her first published paper, at the age of sixteen, is said to have been a flora of the grounds of the Hartford High School. Her special interests centered later on the bryophytes and more especially on the Hepaticae. About thirty papers were published by her, mostly in *The Bryologist*, *Rhodora*, and the *Bulletin of the Vermont Botanical Club*. One on "Jungermannia in New Hampshire" appeared in *Torreya* for March, 1908, and one, entitled "Vegetative Reproduction in the New England Frullaniae" was published in the *Bulletin of the Torrey Botanical Club* for June, 1912. She never ventured to propose a species as "new," but she published critical notes on many and added many to the New England lists of Hepaticae and several to the list of species previously known as occurring in America. While the present writer was preparing his account of the Ricciaceae for the North American Flora, she sent to him from various parts of New England living specimens which were kept under cultivation for a time at The New York Botanical Garden and were of much service in preparing descriptions. The herbarium of Miss Lorenz has been given by her father to Yale University. She left also a collection of drawings, in part colored, of all the known

species of New England Hepaticae. Best of all, she leaves many enduring memories of generous enthusiasms and loyal friendships.

MARSHALL A. HOWE.

LEWIS HENRY LIGHTHIPE

Lewis Henry Lighthipe was born at Orange, New Jersey, 24 January 1843. He graduated from Columbia University in 1863, and from the General Theological Seminary, New York City, in in 1866, receiving his master's degree from Columbia in the same year. He at once entered the ministry of the Protestant Episcopal church, being ordained in 1866 by W. H. Odenheimer, bishop of New Jersey. His clerical career was chiefly in the states of New York and New Jersey, but from 1894 to 1899 he was located at South Jacksonville, Florida.

Mr. Lighthipe was an enthusiastic amateur botanist. He became a corresponding member of the Torrey Botanical Club in 1885, and was elected an active member 8 February 1887. He was notably faithful in his devotion to the interests of the Club, attending the meetings with much regularity until the infirmities of advancing age made it necessary for him to give up the trips from his New Jersey home, and finally led him to resign. His resignation was accepted 13 January 1920, and the minutes record the fact that "in recognition of his thirty-four years of faithful service in the Club, it was voted to transfer his name to the list of corresponding members."

He was a charming man and a pleasing speaker, but so modest and unassuming that his name rarely appeared as a botanical writer. The only scientific paper with his name as author seems to be one of a single page, entitled "Notes on the New Jersey flora," published in the Bulletin of the Torrey Botanical Club for January 1886; but his name appears frequently in the minutes of the Club in connection with brief notes, and at the meeting of 14 April 1903 he presented a paper on "The flora of the pine-barrens of New Jersey," of which the abstract (in Torreya) occupies two printed pages. Many specimens, from New Jersey and Long Island, collected by him are now in the Local Flora herbarium, and he collected plants also during his residence in Florida. His personal herbarium of about 7000 specimens was sold in 1920 to the Brooklyn Botanic Garden.

After several years in retirement, Mr. Lighthipe died at his birthplace, Orange, 14 December 1927. His connection with the Torrey Botanical Club, as corresponding member, active member, and again as corresponding member, thus covered a total period of more than forty-two years.

JOHN HENDLEY BARNHART.

PROCEEDINGS OF THE CLUB

MEETING OF NOVEMBER 8, 1927

This meeting was held at the American Museum of Natural History. In the absence of the President and Vice-Presidents, Dr. T. E. Hazen, Editor, occupied the chair. The program of the evening consisted of an illustrated lecture by Dr. Ralph H. Cheney of New York University, entitled "Coffee Structure, and the Effect of the Beverage." Dr. Cheney said, in part: "for the great mass of humanity, coffee is a most satisfying, harmless and beneficially stimulating beverage. About forty species of coffee (*Coffea*) have been described by botanists as indigenous to Africa, India and adjacent areas. Nineteen of these species produce coffee beans (seeds) of economic value, but only three species—Arabian Coffee, Liberian Coffee, and Robusta Coffee—are of any importance. The bulk of the commercial coffee beans are derived from *Coffea arabica*, a small evergreen tree bearing fragrant white flowers and fleshy, cherry-like fruits possessing a sweet edible pulp and containing two coffee beans with their flat sides together. In Persia and Turkey, the dried and roasted pulp is utilized to prepare a bitter preparation known as Sultana Coffee. In Arabia the fruit is allowed to dry intact and the pulp is then removed and used to prepare a pleasant infusion called *Kisher* or *Kahwe*. In Sumatra, coffee leaves, which contain caffeine as well as the seeds, have been employed in the preparation of a beverage. Liberian coffee beans are larger and of a coarser flavor but are used by middlemen, especially in Europe and England, to strengthen grades which by themselves are flavorless.

"The common or Arabian coffee has been known and used from time immemorial by semi-savage tribes of higher Ethiopia, where it is indigenous and grows, wild and cultivated, at the present

time. Bruce, in his "Travels to Discover the Source of the Nile" published in 1678, informs one that the Gallae were a wandering African nation, who, during their journeys into Abyssinia, traveled over vast deserts, and that the only food that they carried consisted of coffee-berries, roasted and pulverized, mixed with grease, rolled into balls, and carried in leathern bags. Each ball—size of a billiard ball—would sustain an individual for a day, when on a marauding incursion or in active warfare, better than a loaf of bread or a meal of meat, because it cheered his spirits in addition to feeding him."

The microscopic structure of the cotyledon was shown by lantern slides of sections with high and low power magnification, and the use of such structures in determining adulteration was discussed. The botanical identity of the various species of coffee was shown by lantern slides—some in color.

"The United States as a nation habitually consumes more coffee than any other people. The United States takes almost one-half of the total shipments entering international trade. The average annual importation of nine and one half million bags during the five years subsequent to the war was an increase in quantity of over 40 percent in excess of the pre-war annual average. During 1921-1925 the Department of Commerce, Washington, ranked coffee as third in value of all the raw products imported into the United States. Coffee was exceeded only by raw silk and sugar.

"Of the various caffeine drinks, such as coffee, tea, chocolate and cocoa, maté, cassena, coca-cola, guarana or Brazilian chocolate, etc., coffee, with its delightful aroma, if for no other quality, is the most satisfying of all because of the inseparable associations between the human sense of taste and smell. Defibrinated and decaffeinated coffees and coffee substitutes lack partially or entirely the aromatic qualities of coffee and therefore they can not produce as pleasing an infusion as 100 percent coffee. There is also a psychological value that coffee brings about by means of its ability to cheer the spirits beyond the reaction of any other common beverage. The alkaloid caffeine is a mild brain and heart stimulant and gives relief from fatigue and hunger. Such co-ordination of mind and body must increase human efficiency. There are instances in which coffee has caused ill-effects in regard to digestive, circulatory,

and nervous reactions. I dare to prophesy, however, that a statistical investigation would reveal the fact that the percent of persons affected injuriously by coffee is not as great as the percent of individuals who suffer from a digestive rash or other metabolic disorders in response to eating strawberries, clams, spinach, and various other foods which a limited number of people manifest an inability to digest or assimilate.

"Coffee has been roasted well, so it is not necessary to *cook* it again in the making, as the desirable constituents are removed by a very brief treatment. Boiling, even for a short period, is deleterious to both the flavor and aroma, and a woody, bitter beverage results. Five minutes' subjection of coffee to water at just *below* (95° C.), the boiling point, removes as much caffeine (80 percent) as can be extracted without very prolonged treatment. After a 5 minute water-treatment, of freshly roasted, ground coffee at 95° C., or at 190° to 195° Fahrenheit, the infusion should be immediately filtered and served. Coffee prepared in this way results in a most palatable stimulating beverage which is not harmful to 95 percent of people."

The contrasting effects of the coffee beverage and nicotine, opium (morphine) and alcohol were discussed.

"Experimental research strongly indicates that for 95 percent to 97 percent of individuals, the moderate quantity of caffeine consumed in one and one-half grain doses, which is the average amount present in the 150 cc. (a little over one gill) of infusion served as a cup of coffee, is a mild stimulant of the heart, brain, and muscles. This action results in a greater power to accomplish mental and physical work without any detrimental after-effect as manifested by a depression in spirits or body functions. The body rapidly increases its activity, but gradually returns to normal without suffering any subnormal or recuperation period which is characteristic of stimulants in general. Caffeine does not apparently draw on the body reserve. It is hardly fair to condemn a beverage, as certain people persist in doing, because it may be slightly injurious to 3 percent of the population when it is a most delightful and invigorating stimulant to the vast majority."

Respectfully submitted

ARTHUR H. GRAVES,
Secretary.

Meeting of December 13, 1927

This meeting was held at the American Museum of Natural History. In the absence of the President and Vice-Presidents, the Secretary presided. The program of the evening consisted of an address by Mr. Norman Taylor entitled "Vegetation of the Allegany State Park." The Allegany State Park is situated in the extreme southwestern corner of New York State, 80 miles south of Buffalo, and with its southern boundary coinciding with the northern state line of Pennsylvania. The Park covers an area of about 100 square miles. The general elevation is about 1300 feet, the highest point being 2475 ft. It contains about 2500 acres of virgin timber located in the central part. There are no lakes or bogs. The bulk of the tract is covered by the Beech-Birch-Maple association, although the Oak-Hickory-Sassafras type occasionally occurs near the Allegheny River. The unusually low minimum temperature of the region is as yet an unexplained phenomenon. During the summer of 1927 the absolute minimum was 34°, the maximum 78°.

Other interesting points brought out by Mr. Taylor will be included in his account of the vegetation of the Park which will shortly be published in the form of a handbook, issued by the New York State Museum.

Arthur H. Graves,
Secretary.

Meeting of January 10, 1928

This meeting was called to order at 8.25 at the American Museum of Natural History. Vice-President Torrey presided. Eighteen members were present. Dr. R. A. Harper spoke of the sudden, sad death on January 9 of Dr. Herbert M. Richards, President of the Club since the beginning of the year 1917. The following resolutions were then offered by Dr. N. L. Britton:
Resolved:

That with profound grief caused by the lamented death of Professor Herbert M. Richards, President of the Torrey Botanical Club, the present Annual Meeting of the Club be adjourned until the meeting on the last Wednesday of January, 1928, to be held at the New York Botanical Garden, and

Resolved:

That a committee of three members be appointed to frame resolutions appreciative of the services of Professor Richards to the Club and to botanical science, for presentation at such adjourned meeting, and

Resolved:

That this Committee act also as a committee to nominate officers of the Club for the year 1928.

By vote of the Club these resolutions were approved, and the following committee appointed to carry out their last two provisions:

Professor R. A. Harper, Chairman
Professor E. S. Burgess
Dr. N. L. Britton

In accordance with the first resolution, as a mark of respect to the memory of the late President, the meeting was then adjourned.

Respectfully submitted
ARTHUR H. GRAVES,
Secretary

NEWS NOTES

Professor Herbert Maule Richards, president of the Torrey Botanical Club since 1917, died at his home on Riverside Drive, New York, on January ninth.

Dr. Richards had been professor of botany at Barnard College for twenty years.

Secretary of Agriculture Jardine announced the latter part of December a revision of the corn borer quarantine. This adds to the area already under quarantine seven hundred and eighty-one townships in Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Indiana, and Michigan. In New York the County of Suffolk and parts of Delaware and Ulster Counties were added, making practically the entire state under regulation. The shipment of cornstalks and ears to uninfested territory is prohibited and inspection and certification of clean shelled corn required.

In the annual report of the Bureau of Plant Industry of the U.S. Department of Agriculture it is stated that in efforts to make the United States self-sufficient in agricultural products experiments have been in progress that prove that Japanese mint, the source of menthol, can be grown successfully with a satisfactory oil content. Santonin, an important vermifuge for hogs, grows exceptionally well in California and Oregon. Rubber producing plants are being grown in Southern California and Florida and experiments will be extended to Arizona, New Mexico, Texas, and South Carolina. Tung-oil trees are already being grown on a commercial scale in Florida with plantations of about 1,300 acres.

At a meeting of the Board of Managers of the New York Botanical Garden on January 10th Mr. Henry W. De Forest was elected president of the board. Henry de Forest Baldwin and F. K. Sturgis were elected vice-presidents; John L. Merrill, treasurer; Dr. N. L. Britton, secretary; and Dr. Marshall A. Howe, assistant secretary.

G. Proctor Cooper sailed from New York on December 3rd for Central America where he will make a study of forest conditions and collect specimens of plants for the New York Botanical Garden, the Yale School of Forestry and the Field Museum of Natural History.

The new rose garden at the Brooklyn Botanic Garden is nearing completion, the unusually mild weather last fall having favored both building and planting. The work of construction has been carried on under the direct supervision of Mr. Montague Free, Horticulturist of the Brooklyn Botanic Garden, with the assistance of frequent conferences with Mr. Harold A. Caparn, Consulting Landscape Architect of the Botanic Garden, and also designer of the Rose Garden. Near the south end, the shelter, or pavilion has been completed for some time, consisting of the pavilion proper, with pergola-like entrances or vestibules of similar construction on either side. From the hill to the northward one obtains a splendid view of the garden as a whole, the interior being divided up lengthwise into three rows of beds, each bed being surrounded by a wide grass plot. Eighty-five concrete uprights mark the boundaries of the garden, and on

these, as mainstays, a marginal trellis has been erected to furnish support for varieties of climbing roses.

When it was found that the original sum of $10,000 donated by Mr. and Mrs. Walter V. Cranford of Greenwich, Connecticut, was not sufficient, the donors increased their gift to $15,000. Approximately 1,000 roses have already been set out. Ultimately the garden will require about 3,000 plants.

Plans have been prepared for the new Life Sciences Building which will be erected on the campus of the University of California at Berkeley. The building will accomodate the departments of anatomy, bacteriology, biochemistry, physiology, botany, zoology, psychology and a museum of vertebrate zoology.

On February 16, Professor Hugo de Vries celebrated his eightieth birthday. Since he retired from the professorship of botany in the University of Amsterdam he has lived in the village of Lunteren, Holland. Here he has his garden and laboratory where he is still carrying on experiments on mutation with Oenothera.

The Torrey Botanical Club

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A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 53, published in 1926, contained 671 pages of text and 29 full page plates. Price $4.00 per annum. For Europe, $4.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–53 can be supplied separately at $4.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (50 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–17 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **Index to American Botanical Literature**, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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TORREYA

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March-April, 1928

REVEGETATION OF BEECH-MAPLE AREAS IN THE DOUGLAS LAKE REGION*

Marjorie L. Woollett and Dorothy Sigler

The Douglas Lake region, Cheboygan Co., Michigan, lies in a transition zone between the northeastern coniferous forests and the central deciduous forests. There are many well-drained ridges or moraines in this region that are or have recently been covered by a virgin beech-maple forest.†

Typical trees are: *Acer saccharum*, *Betula lutea*, *Fagus grandifolia*, *Tilia glabra* and *Ulmus americana*. Where trees have fallen, opportunity is given to the many seedlings which soon fill such open places to replace the old trees. Most prominent among the few shrubs in the beech-maple forests are *Sambucus racemosa*, *Ribes cynosbati*, and *Lonicera canadensis*. Of the ground plants, the first or vernal cycle is composed largely of bulbous plants or plants from rootstocks, *Viola canadensis*, *Allium tricoccum*, *Bicuculla canadensis*, *Bicuculla cucullaria*, *Erythronium albidum*, *Trillium grandiflorum*, *Polygonatum biflorum*, *Vagnera racemosa*, and *Hepatica acutiloba*. This vernal display is by far the most dense of any for there is little shade in the forest when these plants bloom. They generally die down after blooming and a few weeks later no trace of them may be seen above ground. The second cycle is composed chiefly of broad, thin-leaved shade plants. Here are found *Aralia nudicaulis*, *Geranium robertianum*, *Geum rivale*, and *Ranunculus abortivus*. The third cycle is composed of a fall flora many members of which are composites such as species of Aster and Solidago.

Only one or two virgin forests now remain because of burning or lumbering. However many of the destroyed areas are now being reforested.

* The work upon which this paper is based was done at the Biological Station of the University of Michigan under the direction of Professor Frank C. Gates.

† Gleason, H. A. The structure of the Maple-Beech Association in Northern Michigan. Papers Mich. Acad. Sci. Arts & Letters, 4: 285–296. 1924.

Areas Studied

A study was made of two virgin forests and eleven areas which are being reforested. A short description will be given of each followed by a table summarizing the species.

On a clay moranic ridge 4 km. west of Pellston is Area A, a virgin beech-maple forest. This was a part of the original virgin forest when white men first entered the country and it is maintaining itself perfectly. The chief trees are *Acer saccharum*, *Fagus grandifolia*, and *Ulmus americana*. There are several hemlock knolls where the shade is greater. Because of fallen trees there is a good deal of sunlight in certain places, resulting in a great variety of ground plants and shrubs.

Area B is a virgin beech-maple forest near areas 5, 6, and 7. The principal trees observed were *Acer saccharum*, *Betula lutea*, *Fagus grandifolia*, *Fraxinus americana*, *Tilia glabra*, *Tsuga canadensis*, and *Ulmus americana*. Many of these trees are very large. The soil is very rich and the humus-leaf cover is about 20 cm. in depth. Parts of this area are low, and here more lowland forms are found. Abundance of seedlings insures indefinite repetition of the forest unless man interferes.

Various areas which were once beech-maple forests (locally called hardwoods) and have been disturbed by fire, lumbering, or cutting, were examined to determine the nature of the reforestation. The drainage and soil of these areas are good, and the topography rolling.

About 0.8 km. west of Bryant's Hotel on a slope was a beech-maple forest known as Bryant's Hardwoods (area 1). This was lumbered in the winter of 1911–1912, and in 1914 it was covered with *Epilobium angustifolium*. From 1917 until 1920 every indication showed that this region would be typically aspen. However by 1921 small beeches and maples began to become dominant. The aspen association was nipped in the bud although many ground plants are still characteristic of the aspen association. Now the trees are almost entirely *Fagus grandifolia*, *Acer saccharum*, and *Acer rubrum*. These trees are less than ten years of age and show every indication of vigorous growth and spread.

About 0.2 km. from Douglas Lake at North Fishtail Bay on a slope toward the lake is an area known as North Fishtail Hardwoods (area 2). In 1915 it was a fine beech-maple forest.

Since then, part of it has been burnt over twice, the second burning being in 1919. Every indication points to the fact that the beech-maple will remain here unless disturbed by fire.

In an area about 1.6 km. north of Sedge Point there was a beech-maple climax forest which was lumbered in 1912–1915 (area 3). In the three years following, coppicing began, but in 1919 a forest fire swept all of the area. The area is now used as pasture, and presents an irregular checker board appearance of miniature forest practically unmolested and grass and weed covered ground between. In the future as the trees grow higher they are expected to shade out the grass and completely reëstablish the beech-maple forest.

North of area 3 is the remnant of a second growth beech-maple forest (area 4). There is a leaf-humus cover varying from 2.5–10 cm. in depth over most of the ground. This area was partially lumbered in 1919–1920 but many large trees over twenty years in age remain. There are many open spaces in which pioneer plants abound. Although this area has been pastured, if left undisturbed as it now is, the present reproduction of maple will tend to bring it back to its former state.

About 1.5 km. southwest of Mud Lake is a tract of ground which was once entirely covered by a virgin beech-maple forest (areas 5, 6, 7) in which three sets were studied showing different stages of coppice development. Part of this tract (area B) is still covered by a virgin forest, but the rest has been cleared and a portion allowed to revert to forest. These areas are becoming typical second growth beech-maple forests.

Northeast of Riggsville about 2.5 km. is an area covered by a second growth beech-maple forest (area 8). This is a remnant of a larger forest but the territory surrounding it has been cleared and is now being farmed. If this area is left undisturbed, it will become a typical beech-maple forest.

At Riggsville Corners (area 9) there is a second growth hardwood area with trees of 30–35 years of age. It has been pastured somewhat and subjected to ground fires. It is now a typical beech-maple forest in so far as the trees are concerned, and the ground plants are becoming so in the absence of pasturing, during the last few years.

Back of North Woods Camp near Bogardus Point is a second growth beech-maple forest (area 10). This has been undisturbed

by fire or cutting for at least twenty-five years. Because of the proximity to the lake, the situation is a well drained one but is somewhat lower and more moist than any of the other areas studied. The tree species include not only the typical beech-maple trees but also a great deal of *Tsuga canadensis* mostly 24–25 years old. Some *Pinus strobus* seedlings were observed but these were not growing well.

In addition to the studies made near Douglas Lake, a small area about 100 × 650 m. located in the State Game Refuge in Emmet County was observed (area 11). It is at the base of an old dune and is completely surrounded by a coniferous forest. The future development of this little area is promising for it represents a comparatively recent invasion by the beech-maple forest into a piney area. Spread from this nucleus is to be expected.

Results

As a result of tree counts and quadrat counting the following table shows a comparison between the tree composition of the virgin beech-maple forests of the region and that of the reforesting areas studied.

Tree Composition of the Beech-Maple Forest

	Percent in typical beech-maple forest*	Per cent in reforesting areas studied
	Normal Species	
Acer rubrum	3.7	1.7
Acer saccharum	35.9	67.3
Betula lutea	4.1	.9
Fagus grandifolia	21.2	6.8
Fraxinus americana	.8	X†
Ostrya virginiana	1.4	.9
Tilia glabra	2.1	.6
Tsuga americana	14.6	2.7
Ulmus americana	2.9	1.5
	86.7	82.4
	Prominent Relics	
Betula papyrifera	1.4	4.0
Pinus strobus	1.5	0.0
Quercus borealis	0.7	X†
	90.3	86.4

* Tree count from 18,000 trees. Data from F. C. Gates.

† Found out of quadrat line, so not figuring in the calculation.

Trees not in the Mature Beech-Maple Forest		
Abies balsamea	0	2.4
Populus grandidentata	0	2.8
Populus tremuloides	0	1.0
Prunus pennsylvanica	0	1.6
		94.2

In the following table, the ground plants found in the reforesting areas are grouped together according to their average frequency index, and type of vegetation. Some plants had a very high frequency index in one area and practically none in the other areas, while others were about equal in each area.

GROUND PLANTS IN REFORESTING AREAS

Average Frequency Index above 10

(Species typical of beech-maple forests are starred)

**Acer saccharum* (seedlings)	59	**Aralia nudicaulis*	14
Rubus strigosus	18	**Osmorrhiza claytoni*	14
**Trillium grandiflorum*	17	**Trientalis americana*	13
Unifolium canadense	16	*Poa pratensis*	11

Average Frequency Index between 5–10

Seedlings of Trees

**Acer pennsylvanicum*
Acer rubrum
**Fagus grandifolia*

Shrubs

Diervilla lonicera
**Sambucus racemosa*

Herbs

Fragaria virginiana
Lactuca canadensis
**Mitchella repens*
Poa compressa
**Polygonatum biflorum*
Taraxacum vulgare
**Vagnera racemosa*
**Viola canadensis*
**Viola papilionacea*

Average Frequency Index between 1–5

Seedlings of trees

Abies balsamea
Betula papyrifera
Populus tacamahaca
Populus tremuloides
Prunus pennsylvanica
Tsuga canadensis
**Ulmus americana*

Shrubs

Acer spicatum
**Lonicera canadensis*
Prunus virginiana
Rhus glabra borealis
Rubus allegheniensis
Rubus triflorus
Taxus canadensis

Herbs or creeping plants

**Actaea alba*	**Galium triflorum*
Antennaria canadensis	*Gaultheria procumbens*
**Arisaema triphyllum*	**Geranium robertianum*
Aster laevis	**Hepatica acutiloba*
**Botrychium virginianum*	*Lycopodium annotinum*
Carex umbellata	**Lycopodium lucidulum*
Cerastium vulgatum	**Osmorrhiza longistylis*
Chimaphila umbellata	*Rumex acetosella*
Clintonia borealis	*Solidago canadensis*
**Dryopteris cristata*	*Vagnera stellata*
**Dryopteris spinulosa*	*Verbascum thapsus*

The following are characteristic of typical beech-maple forests but their Frequency Indices were less than 1% or they did not appear in any quadrat in the reforesting areas: Tree: *Prunus serotina;* Shrub: *Ribes cynosbati;* Liana: *Celastrus scandens;* Herbs: *Adiantum pedatum*, *Agrimonia gryposepala*, *Allium tricoccum*, *Aster macrophyllus*, *Bicuculla canadensis*, *Bicuculla cucullaria*, *Carex albursina*, *Carex arctata*, *Chenopodium capitatum*, *Corallorrhiza maculata*, *Cynoglossum officinale*, *Erythronium albidum*, *Galium circaezans*, *Lappula deflexa*, *Medeola virginiana*, *Melica striata*, *Milium effusum*, *Monotropa uniflora*, *Pyrola elliptica*, *Streptopus roseus*, *Tiarella cordifolia*, *Uvularia grandiflora*, *Viburnum acerifolium*, and *Viola eriocarpa*.

Reforestation in Disturbed Areas Studied

A. *Fire.* Many of the reforesting areas studied have been burnt over. There are two types of fires, (1) ground fires which damage only part of the trees and are local, and (2) fires sweeping everything and killing all the trees and ground plants and destroying accumulated humus.

The succession the first few years after a fire is very similar in all areas. Pioneer ground plants, often lichens like *Cladonia rangiferina*, or, if low ground, liverworts like *Marchantia polymorpha*. *Epilobium angustifolium* often follows this lichen or liverwort stage and is followed by aspens and associated ground plants. This association is characterized by quickly growing, short-lived, sun-loving trees, and sun-loving ground plants, many of which have rootstocks.

From this point the succession goes one of two ways. (1) The aspen stage may become completely developed and from that

go to beech-maple; or (2) if the fire is not too severe as the aspens start to develop, stump sprouting from the burned maples nips the aspen stage in the bud and the area reverts to beech-maple.

B. *Lumbering.* Conditions are radically different where the areas have been lumbered. If the lumbering has been complete, the first year or so afterwards finds some aspen species entering the area and the beech-maple ground plants, seedlings and shrubs dying out from exposure to the sun. Then the stumps of *Acer saccharum* begin to sprout. These coppices soon become very thick. As the shoots grow larger they shade out aspens, and provide sufficient shade for beech-maple ground plants. Then as they grow taller and more dense the shade increases until very few ground plants and seedlings are found. As the trees grow they crowd out the weaker species. This thinning out process continues and more shade plants and beech and other seedlings enter and it becomes a typical beech-maple forest.

C. *Pasturing.* Many of the areas have been or are being pastured. Pasturing does not destroy the forest immediately, of course, but changes the character of the undergrowth and destroys a large percentage of young seedlings, so the future of the forest is endangered. Maples however are somewhat distasteful and so are not readily eaten by cattle. Areas 1, 2, 3, 4, were all burned over about the same time and now *Acer saccharum* has a frequency index of 39.9 in area 1 and 33.6 in area 2. Neither of these have been pastured, and have a variety of other trees. Areas 3 and 4 however have been pastured and *Acer saccharum* has a frequency index of 90 in area 3 and 87.8 in area 4. The presence of certain species not natural in a beech-maple forest always indicates pasturing. Some of these species are *Poa pratensis*, *Poa compressa*, *Phleum pratense*, and *Trifolium repens*. If an area which has been pastured is left undisturbed for a few years, the normal ground plants return, and seedlings of maple and beech again are found.

D. *Abandoned Cultivated Land.* If any of the areas are cultivated for a time after clearing, and are later abandoned, the succession is quite long and involved. First is found a weed stage, a meadow stage and then stages of native ground plants, shrubs and trees to the climax beech-maple forest.*

* Gates, Frank C. Plant Successions about Douglas Lake, Cheboygan County, Michigan. Bot. Gaz. 82: 170–182. 1926.

Summary

1. Many well-drained ridges in the Douglas Lake region, Cheboygan County, Michigan, are occupied by virgin beech-maple forests unless this forest has been destroyed by fire, lumbering, or clearing.

2. A typical beech-maple forest is characterized by trees of *Acer saccharum*, *Fagus grandifolia*, *Betula lutea*, *Tilia glabra*, *Acer rubrum*, *Ulmus americana*, and *Ostrya virginiana*. In some of the forests *Tsuga canadensis* may be quite abundant. Shrubs are few and there are about 35 typical ground plants almost always present in beech-maple forests together with some ground plants found in several habitats. Many individuals in this ground cover are seedlings.

3. The reforestation of beech-maple forests in 11 areas was studied during 1926 by the quadrat method.

4. Lumbered areas without fire return to beech-maple by means of coppice development. Burnt areas usually involved fireweed and other stages and take longer. Pastured areas are still more involved and greatly favor the sugar maple (*Acer saccharum*) at the expense of other species. In abandoned cultivated areas, the succession includes weed and meadow stages before the usual stages to the climax beech-maple forest.

Kansas State Agricultural College,
Manhattan, Kansas.

TWO NEW SPECIES OF PORTULACA FROM MEXICO

Percy Wilson

Portulaca Conzattii P. Wilson, sp. nov.

A rather slender, erect, annual herb, 1.5–3 dm. tall, with slender roots, and tufts of long white hairs in the axils of the leaves; leaves alternate, the blades flat, lanceolate, obovate, or oblanceolate, 1.5–2.7 cm. long, 2.5–4.5 mm. broad, obtuse or acutish at the apex; flowers terminal, in clusters of 2 or 3 surrounded with long white hairs and an involucre of 8 or more leaves; calyx-lobes triangular-orbicular, 5 mm. long, 6.5 mm. wide; corolla yellow, the lobes obovate or elliptic-obovate, 7–8 mm. long, 3–3.5 mm. broad; stamens about 20; style-lobes 4 or

5; capsule subglobose, 4 mm. in diameter, circumscissile at the middle; seeds black, 0.8 mm. wide, rounded-tuberculate.

Type from Cerro San Antonio, Oaxaca, Mexico, July 26, 1906 (*C. Conzatti 1425*, type; *3931*).

Portulaca mexicana P. Wilson, sp. nov.

A fleshy perennial herb, with tuberous roots, and ascending or spreading branches, hairy in tufts in the axils of the leaves; leaves often persistent, the blades terete, linear, 5–9 mm. long, 1.5–2.2 mm. broad, acutish or obtuse at the apex, short-petioled; flowers terminal in clusters of 2–4, surrounded by brownish hairs and an involucre of 9–12 leaves; calyx-lobes orbicular or triangular-orbicular, 3.5–4 mm. long, 3.6–4 mm. broad; corolla-lobes obovate, 4.5–5.3 mm. long, 2.5–3 mm. broad; stamens about 14; style-lobes 3 or 4; capsule ovoid, 4–4.2 mm. high, 3.5 mm. in diameter, circumscissile near the base; seeds 0.6–0.7 mm. in diameter, minutely spiny-tubercled.

Type collected in a lava field, Tizapan, Mexico, July 30, 1901 (*C. G. Pringle 8576*).

New York Botanical Garden.

BOOK REVIEW

Colorado Plant Life*

Not long ago a resident of Colorado asked me where to find non-technical information about the flowers and trees of Colorado. Fortunately, I had just received a copy of Ramaley's Colorado Plant Life and lost no time in recommending it. The book is neither a manual of the Colorado flora, nor a mere list, nor a textbook, but a distinct and apparently a successful attempt to select from the great mass of botanical knowledge a series of facts in which any person may well be interested and which will do much to answer the numerous botanical questions which arise with every intelligent observing person. It has sometimes been said that botany as a field of study in our higher schools lacks the popularity of the humanistic subjects because so much of it deals with phases of plant life with which the student never comes in contact outside the class-room, while his

* Ramaley, Francis. Colorado Plant Life. Pages viii + 299. *133 figures, 3 plates in color.* 1927. The University of Colorado, Boulder. $2.00.

probable future experience with plants, plant life, and plant products is left unprovided for. Rameley's book fills this need in an admirable manner without going into technicalities and with the bold and wise omission of many important but strictly scientific matters. Mushrooms, for example, receive about a page; no mention is made of mycelium or basidiospores, but one paragraph discusses their edibility and a second describes fairy rings.

The book opens with a general discussion of plant sociology, including adaptations, ecological classification, and general relations of plants to the environment. This is followed by a discussion of altitude in its relation to vegetation, which is a matter of prime interest to the people of such a mountainous state. Special chapters then discuss the plant life of streamsides and ditch banks, which in the irrigated districts are often the sole remaining habitats for wild flowers, of mountain parks, of mountain lakes, of the plains, of the mesas and foothills, of the mountains, and of the forests. Another chapter discusses what aspects of vegetation may be seen from a railway train or an automobile. These all give the author an opportunity to bring in brief discussions of agriculture, irrigation, tree-planting, zonation and succession, soil acidity and peat-formation, and numerous other subjects. These are never forced on the reader, but are introduced non-didactically as a natural result of the preceding discussion. Other chapters deal with color in plants, including remarks about starch manufacture, insect pollination, and a list of the more conspicuous wild flowers classified by color; the life of a plant, including respiration, transpiration, growth, inheritance, evolution, and other physiological processes; the architecture of plants, in which anatomy is taken up in more detail; and flowers, fruits, and seeds. The final chapter presents a brief conspectus of the whole plant kingdom and closes with an historical account of the development of botany in the state. Appendices give a key to the trees of Colorado, a list of the publications of the Colorado Vegetation Studies, a catalog of the early spring flora around Boulder, and a short list of botanical books recommended for high-schools and public libraries. The numerous illustrations include figures of plants or their parts in zinc, of Colorado vegetation in halftone, and of numerous wild flowers in color.

H. A. Gleason

PROCEEDINGS OF THE CLUB

Meeting of January 25, 1928

This meeting was held at the Museum Building of the New York Botanical Garden, and was the annual meeting of the Club, this having been adjourned from the regular date, January 10, out of respect to the memory of its late president, Dr. Herbert M. Richards, who died suddenly on January 9, 1928.

The meeting was called to order by Mr. Raymond H. Torrey, Vice-President, at 3:30 P.M. The minutes of the meetings of December 8, December 13 and January 10, were read and approved.

On the motion of Dr. Britton, the Club expressed its appreciation of the splendid services of Mrs. Trelease in securing new members. The following new members were then unanimously elected to membership in the Club:

Miss Hannah Anderson, Lambertville, N. J.

Mr. E. R. T. Berggren, 68 West 71st St., N. Y. C.

Mrs. Arabel Bryan, 125 West 12th St., N. Y. C.

Dr. Harold H. Clum, Hunter College, N. Y. C.

Mr. Norman C. Fassett, Biology Bldg., Univ. of Wisconsin, Madison, Wisconsin.

Dr. Lee M. Hutchins, U. S. Peach Disease Field Laboratory, Fort Valley, Ga.

Mr. Donald Johansen, Dept. of Botany, Stanford Univ., Cal.

Dr. John S. Karling, Schermerhorn Hall, Columbia Univ.

Mr. Darwin S. Levine, 2564 Creston Ave., N. Y. C.

Dr. Clarence Moore, Schermerhorn Hall, Columbia Univ.

Mr. J. A. B. Nolla, Dept. Agriculture & Labor, Insular Experiment Station, Rio Piedras, Porto Rico.

Dr. Morton E. Peck, Dept. of Biology, Willamette Univ., Salem, Oregon.

Mrs. William R. Pitt, Drake Ave., New Rochelle, N. Y.

Prof. J. M. Reade, University of Georgia, Athens, Ga.

Prof. Claude J. Shirk, Neb. Wesleyan University, University Place, Lincoln, Nebraska.

Mr. Abraham Schur, 953 Faile St., Bronx, N. Y. C.

Mr. Morris B. Shoemaker, 202 Lawrence Ave., New Brunswick, N. J.

The following resignations were accepted with regret:

Mr. B. R. Abbott, Mr. W. S. Atwood, Mr. Charles W. Deusner, Dr. F. W. Emerson, Mrs. Helen S. Hill, Mr. Samuel Hirschberg, Prof. G. E. Nichols, Miss Helen E. Saunders, Prof. George G. Scott, Dr. Sheppard Shapiro, Mrs. Marguerite Siegel, Mr. H. E. Thomas, Miss Ruby B. Wilber, Mr. Elba E. Watson.

In accordance with the regular routine of the annual business meeting, the reports of the various officers for the year were read.

The Secretary reported that during the calendar year 1927, mainly through the persistent efforts of the Treasurer, Mrs. H. M. Trelease, 42 members were added to the roster of the Club. During the year, there have been 14 resignations. Four members, Dr. Charles C. Godfrey, Rev. J. H. Lighthipe, Miss Annie Lorenz, and Mrs. Frances Muller have been lost by death. The total enrollment, as of January 1, 1928, was 319.

During the year, we have become affiliated with the American Association for the Advancement of Science, with two representatives on the Council of that organization.

During the year, also, largely through the efforts of Mr. B. R. Abbott, the constitution has been revised according to present-day usage, and codified.

Fourteen regular meetings were held during the year, with a total attendance of 432.

The Treasurer, Mrs. Helen M. Trelease, reported gross receipts of $5515.40, including a balance of $395.71, brought over from 1926. The disbursements in 1927 amounted to $5038.70, leaving a balance of $476.47. The Endowment Fund now totals $4355.14.

Dr. T. E. Hazen, Editor of the Bulletin, reported that Vol. 54 of the Bulletin contained 699 pages and 36 plates. He emphasized the fact that the Club benefits from a very considerable amount of pagination and illustration (notably fine photo-gelatin plates) paid for by contributors.

The Editor of Torreya, Mr. George T. Hastings, reported the publication of the regular six bi-monthly numbers, totaling 119 pages. He spoke of the dearth of articles of local interest and emphasized the need of Torreya for just this sort of material.

The Business Manager, Dr. Michael Levine, reported that the amount received from advertisers was about the same as last year. He expressed the hope that members would coöperate as far as possible by patronizing our advertisers.

Dr. Barnhart, delegate to the Council of the New York Academy of Sciences, reported attendance at the meetings of the Council. Dr. Stout, acting as substitute for Dr. Harper as representative of the Club on the Council of the American Association for the Advancement of Science at the meeting at Nashville in December, 1927, reported attendance at the meeting.

Dr. Gundersen, Chairman of the Field Committee, reported that 35 field meetings with an average attendance of 15, were held during 1927. The largest attendance was 50, at the meeting at Staten Island, June 25, led by Drs. Britton and Hollick. Dr. Gundersen suggested that it might be advisable to select some locality, with provision for over-night shelter, for field headquarters for at least a part of the season.

The Secretary read the report of the committee, consisting of Dr. R. A. Harper, Chairman, Dr. E. S. Burgess and Dr. N. L. Britton, appointed by the Club on January 10, to frame resolutions appreciative of the services of the late Prof. Herbert M. Richards to the Club and to botanical science. The resolutions follow:

Whereas, in view of the lamented death, on January 9, 1928, of Dr. Herbert M. Richards, Professor of Botany in Barnard College since 1898, and President of the Torrey Botanical Club for the past eleven years,

Resolved, that we hereby express our profound grief at his death and our sense of the loss which science has suffered, and in particular the loss sustained by the Torrey Botanical Club,

Resolved, that a copy of these resolutions be furnished to the family,

And Resolved Further, that Professor Hazen be requested to prepare a biographical and bibliographical record of the work of Professor Richards for publication, with a portrait, in the Bulletin of the Club.

These resolutions were approved by vote of the Club members, who rose as a mark of respect to the memory of Dr. Richards.

It was also voted by the Club that the revised and codified constitution and list of members of the Club be printed in Torreya, the details of which were referred to the Editorial Board with power.

With reference to the establishment of a field headquarters

for the Club, as proposed by Dr. Gundersen, the following committee was appointed to consider the question: Dr. Denslow, Dr. Gundersen, Mr. Torrey, Mrs. Mitchell and Mr. Beals.

It was also voted that it was the sense of the meeting that the term of the presidency of the Club be limited so that the same person may not hold the office for more than two successive years.

The officers for 1928 were then unanimously elected. The list of officers appears on the inside of the front cover of this issue of Torreya.

Respectfully submitted,

Arthur H. Graves,
Secretary.

Meeting of February 14, 1928

This meeting was held at the American Museum of Natural History and was called to order at 8:25 p.m. by President Denslow. The following candidates for membership were unanimously elected:

Mr. Clement Gray Bowers, 3225 Bainbridge Avenue, Bronx, New York.

Mr. Richard Haff, 179 Valentine Avenue, Yonkers, N. Y.

Mrs. Leonard Irving, 29th Street, Whitestone, N. Y.

Mr. C. Victor Jordan, 144–26, 87th Road, Jamaica, N. Y.

Prof. Burton E. Livingston, Laboratory of Plant Physiology, Johns Hopkins University, Homewood, Baltimore, Maryland.

Mr. Victor Schechter, 482 West 150 Street, N. Y. C.

Mr. Erdman West, University of Florida, Gainesville, Florida.

Miss Sara Whitlock, 88 Lawrence Ave., New Brunswick, New Jersey.

The resignation of Mr. H. S. Piatt was accepted with regret. The scientific program of the evening consisted of an illustrated lecture by Dr. L. O. Kunkel entitled, Further Researches in Yellows Diseases. Slides were shown of curly top of beet, yellows of aster and Sonchus, spike disease of sandal, yellows of fall dandelion (*Leontodon autumnale*) and yellow daisy (*Rudbeckia hirta*) and others. The flowers of *Rudbeckia hirta*, when affected with the yellows, have a green color. The speaker stated that aster yellows has been transmitted experimentally to more than

70 different species of plants. Curly top of beets has also been transmitted to many plants, but is confined to the western part of this country. Aster yellows occurs in all parts of the U. S.

Peach yellows has been known for 100 years, and resembles both aster yellows and curly top of beets, but although it has been much studied, little definite is known about it. Strawberry yellows is apparently distinct, also witches' brooms of potatoes. The yellows disease of boneset (*Eupatorium perfoliatum*) is apparently distinct from aster yellows. The curly top of beets and aster yellows are transmitted by leaf hoppers: strawberry yellows by an aphid. It is suspected that peach yellows is also transmitted by an insect. A study of peach yellows is beset with many difficulties, among which are the following:

1. Although about 200 kinds of insects are known to visit it, the peach tree has very few insects which are peculiar to it alone. The green peach aphis, the black peach aphis and the tarnished plant bug have been tested to see if they are carriers of the disease, but with negative results.

2. The length of incubation period of the disease makes the problem difficult. It takes at least a year for symptoms to appear.

3. The symptoms are not very distinct in the early stages of the disease.

4. The apparent recovery of diseased trees. If diseased trees are cut down and sprouts appear, these may not show the symptoms of yellows for several years.

5. There is difficulty in getting peach seedlings for experiment, for the young seedlings often go into a type of growth which simulates yellows.

6. It is hard to keep diseased material on hand, for the trees die either directly from the disease or from attacks of borers.

7. On account of their large size, it is hard to work with the trees experimentally. They cannot be put in cages like herbaceous plants. The same is the case with the spike disease of sandal.

8. Experiments with cuttings are hindered by the fact that these are dormant in the winter, the season when there is more time for work of this sort.

Dr. Harper suggested the testing of the plant juices chemically to see if in this way there would be any indication as to whether

or not the plant had the yellows. Since the peach yellows may also occur on one or more species of herbs which would be easier to work with experimentally, it was suggested that careful comparative surveys be made of the vicinity of peach orchards affected with the yellows in order to see if the disease is not also present on one or more herbaceous plants as well as on the peach itself.

Respectfully submitted,

Arthur H. Graves,

Secretary.

Meeting of February 29, 1928

This meeting was held in the Museum Building of the New York Botanical Garden, being called to order at 3:30 p.m. with President Denslow in the chair. The following candidates were unanimously elected to membership in the Club:

Mr. H. M. Romanoff, 360 Lenox Ave., N. Y. C.

Prof. J. J. Thornber, Univ. of Arizona, Tucson, Arizona.

The President spoke of the death of Professor E. S. Burgess, one of the former presidents of the Club. Dr. Howe then read the following minute on his life and work, at the conclusion of which the members of the Club rose in token of respect.

Professor Edward Sandford Burgess

The Torrey Botanical Club records its sense of loss in the death of Professor Edward Sandford Burgess, which occurred on February 23, 1928.

Doctor Burgess was elected a member of the Torrey Botanical Club on April 9, 1895, before his removal from Washington to New York in that year to become Professor of Natural Science in what is now Hunter College. At the beginning of 1897, he was elected Recording Secretary of the Club, a post that he held for six years. The proceedings of the Club, as recorded by him during those years, are models of scientific accuracy, wealth of detail, and beauty of English diction. His two principal botanical publications, the scholarly "History of Pre-Clusian Botany in its Relation to Aster" and "Species and Variations of Biotian Asters; with Discussion of Variability in Aster" constitute volumes 10 and 13 of the Memoirs of the Torrey Botanical Club. Among his other botanical writings, his contributions to Britton and Brown's Illustrated Flora, to Small's Flora of the Southeastern United States, and to the Century Dictionary, are

especially well known. During the years 1912 and 1913, Professor Burgess served ably as the Club's president, and was, *ex officio*, a member of the board of Scientific Directors of the New York Botanical Garden.

In the passing of Professor Burgess, members of the Torrey Botanical Club mourn the loss of a widely known scientist, a successful teacher of botany, and a cultured Christian gentleman.

The Secretary announced the sad death, from pneumonia, of Dr. C. H. Farr, which occurred suddenly on Saturday, February 11. Dr. Farr was Associate Professor of Botany at Washington University, St. Louis, and had been a member of the Club since 1914. He received his doctor's degree from Columbia in 1916.

The Secretary presented the report of the Committee composed of the officers of the Club, to suggest a method of election of delegates and representatives of the Club to organizations with which the Club is affiliated, as follows:

"Delegates and representatives on the councils of the New York Academy of Sciences and the American Association for the Advancement of Science, and other organizations with which the Club is now or shall become affiliated, shall be elected at the Annual Meeting in January, the numbers of such delegates and representatives to be elected, depending on the quota regulations of such organizations."

It was the sense of the meeting that this proposition, after being presented and voted upon according to the regular routine, be incorporated as an article of the Constitution.

In regard to the conflict of the meetings at the American Museum on the second Tuesday of the month, with those of the Linnean Society on the same date, the Secretary reported the following proposition of the committee composed of the officers of the Club:

"Unless otherwise determined by the Club, the regular meetings shall be held on the first Tuesday and the third Wednesday of each month from October to May inclusive, except the third Wednesday of December, at such hour and place as the Club may direct."

It was voted by the Club that Article XVIII of the Constitution of the Club entitled "Meetings" be amended by the omission of the part relating to the regular meetings and that this article, worded according to the report of the committee here presented, be framed as a by-law.

The report of the committee on permanent field headquarters for the Club was deferred until a later date.

The scientific part of the program consisted of an illustrated lecture by Mr. A. E. Hitchcock of the Boyce Thompson Institute entitled "Vegetative Propagation."

The lecture dealt primarily with the rooting responses of stem cuttings as influenced by the type of material selected, by the amount and type of leaf surface, and by the nature of the medium. It was pointed out that in some cases roots grow out from a restricted region on the cutting as, for example, the base of a current year's growth, whether or not two year old wood was attached, (*Prunus tomentosa* and *Daphne cneorum*) or from the nodes (*Viburnum opulus* and *Cotoneaster horizontalis*).

Of particular interest was the fact that in many cases better rooting occurred when all the leaves were left on greenwood cuttings than when the lower leaves were removed according to common nursery practice. The attached buried leaves appeared to act as water absorbing and water storage organs for the entire cutting. Under high evaporating conditions, cuttings with lower leaves removed would wilt readily, whereas those with all leaves left on would remain in a turgid condition.

Acid peat moss alone, or mixed with sand, proved in most cases to be superior to sand. Although acid peat moss was injurious to flowering almond, privet, and *Prunus tomentosa* cuttings, this effect was eliminated by partial or complete neutralization of the acid peat moss with powdered calcium carbonate. (Complete neutralization was obtained by adding from 7 to 10 grams of carbonate per liter of peat moss.)

A specific type of root response, characterized by absence of secondary fibrous roots and a marked increase in root diameter, was obtained when the buds were removed from grape cuttings taken in December. Privet cuttings showed a retarded rooting response when similarly treated.

Cuttings of Dahlia (Jersey Beauty and Ide Ver Warner) were found to be influenced by the length of day. Whereas cuttings taken in early fall formed fibrous roots, those taken in late fall formed storage roots or various other types of storage organs at the base of the cutting or along the stem portion. At the same time there was a marked tendency to form flower buds in late fall and early winter instead of producing vegetative growth.

When placed in six hours' extra light (furnished by a single 1000-watt bulb) both cuttings and seedlings showed practically no tendency to form storage roots, and the tops continued to grow without forming flower buds.

Respectfully submitted,

ARTHUR H. GRAVES,
Secretary.

MARCH FIELD MEETING

The field meetings of the Torrey Botanical Club for the 1928 season were begun with an excursion on Sunday, March 4, along Hook Mountain, on the west shore of the Hudson, between Rockland Lake Landing and Haverstraw, under the leadership of Raymond H. Torrey, chairman of the field committee for this year. The party numbered thirty-one of whom six were members of the Torrey Club, the others being members of the Green Mountain Club, Adirondack Mountain Club, Inkowa Outdoor Club, and Paterson Ramblers.

Warm weather earlier in the week had given hopes for signs of spring, but the day of the excursion was below freezing in temperature, and the leaf and flower buds were halting in progress. Skunk cabbage had blossomed a few days before and even the leaves were unfolding but the spathes were again frozen. The leaf and flower buds of the red-berried elder, Sambucus racemosa, which is a common shrub on the steep outer front of Hook Mountain, as on the Palisades of which it is a continuation, were beginning to unfold for its early blooming.

The party found the rocky shore at the foot of the low cliff of red sandstone, below the contact between it and the overlying diabase, interesting for the variety of glacial boulders, representing northern New York and New England formations. One of the horizontal partings of the sandstone displayed what appeared to be the casts of marine worm burrows. A historical feature was the landing place of Major John André to meet Benedict Arnold, in the plot for the delivery of West Point.

NEWS NOTES

Dr. Edward Sanford Burgess died on Thursday, February twenty-third at his home in Yonkers. Dr. Burgess had been a member of the Torrey Botanical Club for thirty-two years and was president of the club from 1912 to 1914. Three years ago he retired from Hunter College where he was Professor of Natural Sciences. Dr. Burgess was widely known as an authority on asters and had described many new forms.

Mrs. Flora W. Patterson, widely known as a specialist in the study of fungi, died on Sunday, February fifth. Mrs. Patterson was for twenty-seven years, 1896–1923, mycologist in charge of the pathological collections of the Bureau of Plant Industry of the U. S. Department of Agriculture. Mrs. Patterson was the author of many bulletins on fungi published by the Department of Agriculture. She was born eighty years ago in Columbus, Ohio.

Honorary Curator S. B. Parish of the University of California herbarium celebrated his ninetieth birthday on January thirteenth. Mr. Parish has served at various times as collaborator in the Desert Laboratory of the Carnegie Institute and as a lecturer at Stanford University. He had been Honorary Curator of the herbarium at The University of California for seven years and still devotes part of his time to work there.

At the Nashville meeting of the Botanical Society of America Dr. A. H. R. Buller of the University of Manitoba was elected president for the ensuing year. Dr. I. W. Bailey of Harvard was elected vice-president.

The botanical specimens of the late Ellsworth Bethel, of Denver, have been given to the Colorado Agricultural College and the University of Colorado. The collections consist of over 10,000 mounted specimens and a much larger number of unmounted ones. Most of the specimens are of plants of Colorado.

In Torreya for September–October, 1921, a note appeared announcing the presentation of Mr. J. Roberts Lowrie's herbarium to the Pennsylvania State College. This gift was rich in plants of *central* Pennsylvania.

The College is now the recipient of the herbarium of Mr. George W. Caffrey which is composed chiefly of plants of *eastern* Pennsylvania. There are 630 sheets in the collection, very few in duplicate, collected widely from among Angiosperms and Pteridophytes.

The collection is an example of the excellent local flora work so often accomplished by men and women who are not professional botanists, for Mr. Caffrey was a wood-engraver and carver by vocation. In the pursuit of his hobby, he attracted others into the field of natural history and his influence was such as to lead to the organization of a Natural History Society at Bethlehem, Pennsylvania, where he lived most of his life. Mr. Caffrey died June 5, 1927, at the age of 81 years.

Dr. Bernarn O. Dodge, formerly an instructor in Columbia University and for some years secretary-treasurer of the Torrey Botanical Club, has been appointed plant pathologist at the New York Botanical Garden. Dr. Dodge has been connected with the United States Department of Agriculture for the last eight years. He will begin his work at the Garden on the first of May.

Dr. Roland M. Harper has just finished a state report on the vegetation of Florida. Dr. Harper has gone through the 1927 edition of American Men of Science to find how many were from Florida. In most parts of the country, he says, there are more chemists than any other kind of scientist, but Florida is unique in having more botanists. There are twenty-one botanists listed, half of them pathologists. Curiously all of the resident scientists listed are natives of other states. The native scientists are all living and working in other states.

Dr. Lewis Knudson, Professor of Plant Pathology at Cornell University, is studying wilt-disease of bananas in Guatemala. Dr. Knudson's work in Central America during the past few years is credited with having saved large sums to the fruit industry. Incidentally one New York newspaper refers to Dr. Knudson as a plant psychologist.

April 24th has been selected as National Wild Flower Day, set apart for teaching about our wild flowers and their conservation. The week beginning on April 24th is American Forestry Week.

Dr. Arthur P. Kelly, assistant professor of botany at Rutgers University, has been appointed Associate Ecologist at the Allegheny Forest Experiment Station. The headquarters of the station are at the University of Pennsylvania, and its work covers forest research in New Jersey, Pennsylvania, Delaware and Maryland.

Educational work was featured in the Brooklyn Botanic Garden's exhibit at the International Flower Show at the Grand Central Palace, N. Y. C., March 19–24. The center of the booth was occupied by a large table on which the "Evolutionary Tree of the Plant Kingdom" was arranged in diagrammatic form, with living plants illustrating each of its branches—algae, fungi, mosses, hepatics, clubmosses, ferns, cycads, conifers, dicotyledons and monocotyledons. On another table a model of the children's gardens, constructed by Miss Kathryn P. Clark, instructor, was exhibited. Two types of Wardian cases were shown, as well as articles made by children in classes at the Garden, which included small desert gardens, basket work, flower calendars, leaf print collections, etc.

Sporelings of the rare Hartstongue Fern with a special leaflet on the subject, written for the occasion by Dr. R. C. Benedict, illustrated the Garden's activity in the conservation of native plants. Petri dishes filled by the Garden and exposed by the pupils of one of the New York City High Schools for the study of bacteria and molds, were shown as an example of this form of the Garden's cooperation with the schools.

Dr. H. A. Gleason, of the New York Botanical Garden, sailed on March 22 for England. He will spend several months in the study of British Guianan plants in the Kew Herbarium, then visit other herbaria in England and on the Continent.

Cornell University has recently received a gift of a tract of 500 acres of abandoned farm land in Newfield to be used for work in forestry and botany.

The Allegany Park Summer School will commence its second session on July 7th and continue through August 25th. The school is located in the Allegany State Park in the south-western part of New York State. The faculty of the school this summer will consist of Dr. Robert E. Coker, director and professor of

field zoology; William P. Alexander, nature study; Prof. Allen C. Tester, field geology; Dr. Fred W. Emerson, field botany; Areta A. Saunders, bird study. Circulars describing the school can be obtained from the New York State Museum, Albany, N. Y.

Dr. E. W. Brandes, of the United States Department of Agriculture, sailed from San Francisco in April 12th with Dr. Jacob Jesweit, of the University of Wageningen, Holland, for Dutch New Guinea. Mr. E. C. Pemberton, entomologist of the Hawaiian Sugar Planter's Association, joined the party in Honolulu. In New Guinea, supposed to be the original home of sugar cane, the party will hunt for disease-resistant varieties of cane. Part of the exploring will be done by airplane. The plane has been furnished by Mr. B. G. Dahlberg, president of the Celotex Company, makers of synthetic lumber from sugar cane bagasse.

The Torrey Botanical Club

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Vol. 28 May-June, 1928 No. 3

TORREYA

A Bi-Monthly Journal of Botanical Notes and News
EDITED FOR
THE TORREY BOTANICAL CLUB
BY
GEORGE T. HASTINGS

John Torrey, 1796–1873

CONTENTS

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VOLUME 28

New York
1928

TORREYA

Vol. 28 No. 3

May-June, 1928

Contributions to the Flora of Long Island, New York, Fifth Paper[1]

William C. Ferguson

The plants listed below represent species collected in 1926 and 1927. In my experience these are rare, or occasional, and not previously published in my series. New localities for rare species previously published are also included and others not so rare where known localities are very few. These were all collected by me except the few where the collector's name follows the locality. All are in my herbarium and duplicates of most have been deposited in public herbaria. All grasses were reviewed by Mrs. Agnes Chase, *Carex* by Mr. K. K. Mackenzie, and all doubtful plants by the New York Botanical Garden. I am grateful for this cooperation which adds to the value of the paper.

POLYPODIACEAE

Dryopteris cristata × marginalis Davenp. Rare in wet woods. Hempstead. Determination by R. C. Benedict.

SELAGINELLACEAE

Selaginella apus (L.) Spring. Rare in wet or damp shade. Three Mile Harbor (Latham and Ferguson).

SPARGANIACEAE

Sparganium eurycarpum Engelm. Rare in swamps. Flushing; Oyster Bay; Newtown.

ZANNICHELLIACEAE

Potamogeton natans L. Rare in ponds and pools. Woodside.
Potamgetan foliosus Raf. Rare in ponds and pools. Woodside.

ALISMACEAE

Sagittaria Engelmanniana J. G. Smith. Rare or occasional in sandy swamps and shores. Long and Lily Ponds, Sag Harbor; Poxabogue Pond; Bridgehampton; Lindenhurst.

Sagittaria teres S. Wats. Rare in shallow water. Eastern Long Island; Artist Lake, Middle Island.

[1] Previous papers in this series appeared in Torreya **22**: 43–49, 1922; Bull. Torreya Club **51**: 177–201, 1924; **52**: 133–136, 1925; **53**: 303–308, 1926.

LEPTOLOMA COGNATUM (Schultes) Chase. Rare in dry soil. Great River.

PASPALUM PUBESCENS Muhl. (*P. Muhlenbergii* Nash.) Occasional in open dry soil. Bridgehampton; Montauk; Wading River; Garden City; Deer Park; Cold Spring Harbor. '*Paspalum pubescens* Muhl and *P. Muhlenbergii* Nash vary only in the amount of pubescence and in their being more intermediates than typical forms. Hitchcock and Chase now group them as above.

PANICUM WERNERI Scribn. Rare in dry sandy soil. Lindenhurst; Northeast of Deer Park; Ronkonkoma; Massapequa.

PANICUM BICKNELLII Nash. Rare in dry sandy soil. Seaford; Wantagh; Smithtown; Rosedale; Hempstead Reservoir. The localities Massapequa and Ronkonkoma reported in my fourth paper are errors.

PANICUM ANNULUM Ashe. Rare in hilly woods. Kew Gardens. I can find no previous record for New York State.

PANICUM COMMUTATUM Schultes. Rare in dry or moist woods or open ground. Kew Gardens.

PANICUM ACULEATUM Hitchcock and Chase. Rare in dry or moist open ground and thickets. Merrick.

ARISTIDA OLIGANTHA Michx. Very rare in open dry soil. Syosset. Growing with *A. dichotoma*. I can find no previous record for Long Island. Hitchcock and Chase have written me that it is to be looked for as native.

ARISTIDA LONGESPICA Poir. (*A. gracillis Ell.*)[2] Rare in dry open ground; nearly always associated with common A. dichotoma. Quogue; Brentwood; Pinelawn; North of Lindenhurst; Great River; Northport; Amityville.

SPOROBOLIS ASPER (Michx.) Kunth. Rare in dry sandy soil inland and on beaches. North Beach; Eatons Neck; North Sea; Merrick.

SPOROBOLIS CRYPTANDRUS Torr. A. Gray. Rare in dry sandy soil. inland, and on beaches. Cold Spring Harbor.

TRISETUM PENNSYLVANICUM (L.) Beauv. Rare in wet open swamps and swampy thickets. Yaphank; Cold Spring Harbor.

PANICULARIA NERVATA (Willd.) Kuntz. var. STRICTA Scribn.[3] Very rare in drier part of Marsh at Winfield. A much smaller plant than typical *P. nervata*, with darker spikelets and maturing a month or more earlier, and growing in drier soil. I can find no previous record for Long Island. House records it from Indian Pass and perhaps elsewhere northward.

PUCCINELLIA FASCICULATA (Torr.) Bicknell. Rare in salt marshes and on sea beaches. Oyster Bay.

FESTUCA RUBRA L. var. MULTIFLORA (Hoffm.) Asch. and Grabn. Very rare in salt marsh at Massapequa.

[2] Hitchcock, A. S. The North American species of *Aristida*. Contrib. U. S. Nat. Herb. **227**: 538.

[3] House, H. D. Annotated list of the ferns and flowering plants of New York State. Bull. New York State Mus. 254: 117-118. 1924.

CYPERUS SABULOSUS Mart. and Schrad. Rare in waste ground. Native of Virginia and South. Introduced at Plattsdale.

CYPERUS HOUGHTONI Torr. Rare in dry sandy pine barrens. South Riverhead. I can find no previous record for Long Island.

ELEOCHARIS INTERSTINCTA (Vahl.) R. and S. Very rare in ponds. Big Long, Little Long, and Round Ponds, Sag Harbor, (Latham and Ferguson). I can find no previous record for Long Island.

SCIRPUS MICROCARPUS Presl. (*S. rubrotinctus* Fernald). Very rare in swamps. Kissena, Flushing.

FUIRENA SQUARROSA Michx. Rare in swamps and borders of ponds. Fore and Aft, and Round Ponds, and Little North West Swamp, Sag Harbor (Latham and Ferguson); Long and Lily Ponds, Sag Harbor; Poxabogue Pond, Bridgehampton.

PSILOCARYA SCIRPOIDES Torr. Rare in wet sandy shores or shallow water. Lily Pond, Sag Harbor; Poxabogue Pond, Bridgehampton. Discovered two weeks earlier than my find at a pine barren pond in Calverton by Mr. Roy Latham.

SCLERIA TRIGLOMERATA Michx. Rare in moist soil. Lindenhurst; Merrick.

SCLERIA TORREYANA Walp. Very rare in sandy swamps and shores. Poxabogue Pond, Bridgehampton. Growing with *S. reticularis*, but very distinct in appearence.

CAREX ROSEA Schk. Rare in wet or rich woods. Deer Park; Kew Gardens. *C. convoluta* Mackenzie, is the common species of this group on Long Island.

CAREX TRISPERMA Dewey. var. BILLINGSII Knight. Rare in sphagnum swamps and thickets. Speonk; Babylon. The plant published in my second paper from south of Flanders as this species is also var. *Billingsii.*

CAREX EXILIS Dewey. Rare in swamps. Shinnecock.

CAREX CRISTATELLA Britton. Rare in swamps and wet woods. Laurelton; North Beach; Winfield.

CAREX PROJECTA Mackenzie. Very rare in swamps. Winfield.

CAREX CRAWFORDII Fernald. Very rare in sandy and gravelly soil. Long Beach Road. I can find no previous record for Long Island.

CAREX BEBBII Olney. Very rare in swamps. Winfield. I can find no previous record for Long Island.

CAREX TENERA Dewey.[4] Rare in swamps. Winfield; Woodside. I can find no previous record for Long Island.

CAREX ALATA Torr. Rare or occasional in swamps. Winfield; Woodside; South Jamaica; South of Ozone Park; Wading River; Riverhead; Montauk; Three Mile Harbor (Latham and Ferguson); Sag Harbor (Latham and Ferguson).

CAREX LEUCORUM Willd. Rare in dry soil. Rockville Center; Middle Island; Massapequa; Babylon.

CAREX POLYMORPHA Muhl. Very rare in dry and moist soil. Hempstead Reservoir; Laurelton; Seaford.

[4] Mackenzie, K. K. Bull. Torrey Club **42**: 606–608. 1915.

Carex tetancia Schk. Very rare in damp and wet meadows. Winfield.

Carex granularis Muhl. Very rare in swamps. Winfield.

Carex conoidea Schk. Very rare in swamps. Winfield.

Carex hirsutella Mackenzie. (Carex complanata Torr.) Rare in hilly rich woods and thickets. Richmond Hill, Flushing.

Carex pallescens L. Rare in swamps and damp meadows. Millneck; Winfield.

Carex Barrattii Schw. and Torr. Rare or occasional in distribution. Lindenhurst (abundant); Babylon; Laurelton.

Carex strictior Dewey. Occasional in distribution; in large colonies where found. Bridgehampton; Easthampton; Watermill; Meadowbrook, Cold Spring Harbor.

Carex hystricina Muhl. Rare in swamps. Flushing; Newtown.

JUNCACEAE

Juncus articulatus L. Rare in swamps and on fresh and brackish shores. Seaford (two stations); Flanders; Watermill; Montauk; Point-of-Woods; Long Beach.

Juncus scirpoides Lam. Rare in swamps and on wet shores. Valley Stream; Hempstead; Wading River; Coram; Sag Harbor (Latham and Ferguson).

Juncus subcaudatus Coville and Blake.[5] Rare in swamps. Cold Spring Harbor (two stations); North Bellmore. Included in Britton and Brown's Illustrated Flora With *Juncus canadensis* and in Gray's Manual as var. *subcaudatus* of that species.

LILIACEAE

Allium canadense L. Rare in wet or dry woods and meadows. North Beach; Smithtown; Wantagh.

Trillium cernuum L. Rare in wet or most rich woods. Cold Spring Harbor (three stations); Bayside; Roslyn; Millneck (two stations); Flushing; Millstone (F. Benedict).

ULMACEAE

Celtis crassifolia Lam. Rare in woods and thickets. Forest Park; Kings Park; Flushing; Newtown.

HAEMODORACEAE

Gyrotheca tinctoria (Walt.) Salisb. Rare on sandy shores and in sandy swamps. Rankonkoma; Big Long Pond and Little Long Pond, Sag Harbor; Round Pond (Latham and Ferguson), Fore and Aft Pond (Latham and Ferguson), Sag Harbor.

[5] Coville, F. V., and Blake, S. F. Flora of the District of Columbia and vicinity. Contrib. U. S. Nat. Herb. **21**: 119. 1919.

CORRIGIOLACEAE

ANYCHIA POLYGONOIDES Raf. Rare in dry pine barrens. Wyandanch.

ALSINACEAE

ALSINE LONGIFOLIA (Muhl.) Britton. Rare in swamps. Winfield.

ALSINE ULIGINOSA (Murr.) Britton. Rare in cold springs and streams. Cold Spring Harbor.

SAGINA PROCUMBENS L. Rare on wet shores and springy and boggy woods. Three Mile Harbor (Latham and Ferguson).

MENISPERMACEAE

MENISPERMUM CANADENSE L. Rare in rich hilly woods. Newtown.

ROSACEAE

AGRIMONIA STRIATA Michx. Rare in thickets and fields. Cold Spring Harbor.

MALACEAE

CRATAEGUS PRUINOSA (Wendl.) K. Koch. Rare in dry hilly woods. Kings Park. Determination by W. W. Eggleston. I can find no previous record for Long Island.

AMYGDALACEAE

PADUS NANA (DuRoi) Roemer. Very rare. Wet hilly woods. Cold Spring Harbor.

FABACEAE

MEIBOMIA CANESCENS (L.) Kuntze. Rare in rich soil, borders of woods and thickets. Bayside; Flushing.

LESPEDEZA ANGUSTIFOLIA (Pursh) Ell. Occasional in dry or moist soil and in pine barrens. Hempstead Plains at Mineola and Garden City; Middle Island on damp shores of Artist Lake; Brentwood; Central Park; Valley Stream; Lindenhurst; Pineaire; Deer Park; Massapequa. All the above are in my herbarium. I have also seen and recorded it at Smithtown; Coram; Central Islip; Farmingdale; Wyandanch.

LESPEDEZA HIRTA×CAPITATA. Vary rare in dry pine barrens. Brentwood; Ronkonkoma.

LESPEDEZA HIRTA×ANGUSTIFOLIA. Very rare in dry pine barrens. Pineaire. Both of the above hybrids were growing in contact with the presumptive parents and were intermediate in characteristics between them. The determinations were confirmed at the New York Botanical Garden.

ILICACEAE

ILEX LAEVIGATA (Pursh) A. Gray. Rare in swampy thickets. Merrick; Lindenhurst; Amityville; Seaford.

NEMOPANTHUS MUCRONATA (L.) Trelease. Rare in swampy thickets. Lindenhurst.

VITACEAE

VITIS VULPINA L. Rare in rich woods. North Beach.

VIOLACEAE

VIOLA EMARGINATA (Nutt.) Le Conte. var. ACUTILOBA Brainerd. Rare in hilly, dry, oak woods. Northport. Growing with the species. I can find no previous record for Long Island. The determination confirmed by Dr. H. D. House.

AMMIACEAE

ANGELICA ATROPURPUREA L. Rare in swamps and moist ground. North Beach; Newtown.

LILAEOPSIS LINEATA (Michx.) Greene. Rare in salt and brackish marshes and shores. Cold Spring Harbor.

VACCINIACEAE

GAYLUSSACIA DUMOSA (Andr.) T. and G. Rare in sandy swamps. Flanders; Bridgehampton; Speonk; Westhampton; Wyandach; Little West End, Sag Harbor (Latham and Ferguson).

VACCINIUM NIGRUM (Wood) Britton. Rare in dry soil. Seaford.

PRIMULACEAE

LYSIMACHIA PRODUCTA (A. Gray) Fernald. Rare in swamps and wet thickets. Babylon.

CUSCUTACEAE

CUSCUTA CORYLI Englm. Rare in wet thickets and swamps. Easthampton; East Islip.

MENYANTHACEAE

MENYANTHES TRIFOLIATA L. Rare in swamps. Newtown.

ASCLEPIADACEAE

ASCLEPIAS VARIEGATA L. Rare in hilly rich woods. Queens; Three Mile Harbor; Sag Harbor (Latham and Ferguson).

SCROPHULARIACEAE

AGALINIS HOLMIANA (Greene) Pennell. Occasional in dry pine barrens, oak woods and thickets. Middle Island; Central Islip; Sag Harbor; Setauket; Kings Park; Central Park; Ronkonkoma; Pinelawn; Easthampton; Mastic; Pineaire.

AGALINIS VIRGATA Raf. Rare in sandy and wet shores. Fore and Aft Pond, Sag Harbor (Latham and Ferguson).

PEDICULARIS LANCEOLATA Michx. Rare in swamps. Flushing; Newtown.

RUBIACEAE

DIODIA TERES Walt. Occasional in dry open soil. Cold Spring Harbor; Valley Stream; Springfield; South of Jamaica; Aqueduct; Sag Harbor; Garden City; Oakdale; Millneck.

OROBANCHACEAE

LEPTAMNIUM VIRGINIANUM (L.) Raf. Occasional in beech woods. Millstone; Queens; Smithtown; Montauk. The above are in my herbarium but I have observed and noted this plant in the following localities: Plattsdale; Roosevelt; South of Hempstead; Bridgehampton, Locust Valley; Bayside.

CONOPHOLIS AMERICANA (L.f.) Wallr. Rare in rich hilly woods at base of trees. Locust Valley. I can find no previous record for Long Island.

COMPOSITAE

SOLIDAGO ASPERULA Ait. Rare on borders of salt marshes and near them. Merrick; Millneck; Point-on-Woods; Bayville; East Islip.

ASTER HERVEYI A. Gray. Rare in dry hilly oak woods and their borders. Lily Pond, Sag Harbor. A few days before discovering this colony Mr. Roy Latham found a colony a short distance south of Lily Pond.

GNAPHALIUM HELLERI Britton. Rare in dry pine barren and oak woods and thickets. Sag Harbor (Latham and Ferguson); Great River.

EUPATORIUM LEUCOLEPIS T. and G. Very rare in sandy swamps and shores. Fore and Aft Pond, Sag Harbor (Latham and Ferguson).

EUPATORIUM SESSILIFOLIUM L. Rare in woods and thickets. Greenvale; Port Washington; Deer Park; Wyandanch; East of Meadowbrook.

EUPATORIUM ALBUM L. Rare in dry pine and oak woods and also in moist soil. Pine barrens at Speonk.

HELENIUM AUTUMNALE L. Rare in swamps but occasionally in large colonies. South of Jamaica; Flushing; Woodside.

HEMPSTEAD, LONG ISLAND.

White-fruited Bane-berries

KENNETH K. MACKENZIE

For many years American botanists were familiar with two species of bane-berry, the first with oval or ellipsoid red berries on slender pedicels in an ovoid raceme, the second with short oval white berries on thick pedicels in an oblong raceme. The first of these appeared in our botanies as *Actaea rubra* (Ait.) Willd. and the second as *Actaea alba* (L.) Miller. Then when

collections began to come in more abundantly from Maine and Quebec and the adjacent country, it was found that plants with white berries, but otherwise agreeing with *Actaea rubra*, were either frequent or occasional there. These plants are apparently albinos (as to berries) of *Actaea rubra*, and have appeared in our botanies, I believe correctly, as *Actaea rubra* f. *neglecta* (Gillman) Robins. I have myself had a field acquaintance with this plant both in northern Maine and in Quebec, and Brother Victorin writes that in Quebec it "is met with apparently in the whole range. It may be frequent or not, but I incline to think it is rather rare." While of the *Actaea alba* of our manuals he says "with us is a much less universal plant. In the District of Montreal it is frequent but much less than *A. rubra*. It is more abundant in the Richelieu Valley. It also occurs in Anticosti."

The history of our American bane-berries began in 1635 in that wonderful early work by Cornut dealing with Canadian plants. He had a plant which he very accurately figured (pl. 77) and which he called Aconitum baccis niveis et rubris (p. 76). Morison in 1680 (Pl. Hist. Univ. 2 p. 8, s. 1, t. 2, f. 7) dealt with a plant which he called Christophoriana racemosa americana baccis niveis et rubris. This is the same plant as Cornut had. In fact, it looks to me as if Morison's figure was taken from the figure of Cornut.

When Linnaeus came to deal with the matter in 1753 (Sp. Pl. 1:504) he had no specimens. (Jackson in Proc. Linn. Soc. Suppl. 1912 p. 28.) He simply cited Cornut and Morison and called their plant *Actaea spicata* var. *alba*.

Miller in the eighth edition of his Gardeners Dictionary, which appeared in 1768, published his *Actaea alba*. He cited Morison, but he did not cite Linnaeus, and it is not correct therefore to write *Actaea alba* (L) Miller. Miller grew the plant, but unfortunately no specimens of his plant seem to have been preserved. At least, Dr. Rendle writes that there are none in the British Museum, where other specimens from Miller are preserved. His description however calls for a plant "racemo ovato."

In the previous (7th) edition of his Gardeners Dictionary published in 1759, Miller says he also received seeds of another Actaea with red berries from North America but that these did

not grow and "I do not know whether it be a distinct species, or only an accidental variety."

Both the illustration by Cornut and the illustration by Morison represent a plant with slender pedicels and having an ovoid raceme and ovoid or ellipsoid berries. The only definite points to go on with Miller are his phrase "racemo ovato" and his reference to Morison's figure. In other words, Cornut, Morison, Linnaeus and Miller all seem to have been dealing solely with *Actaea rubra* f. *neglecta*. Not a bit of evidence has appeared that they had the plant with thick pedicels and an oblong raceme appearing in our manuals as *Actaea alba*.

We must then apply names. This is not an easy matter. One can follow the historical development of our knowledge of this species and say that as *Actaea alba* was the first binomial applied to our bane-berry with slender pedicels, it should be known by that name, and that the ordinary red-fruited plant should be known as a form. On the other hand, one can follow nature and say that the red-fruited plant is undoubtedly the specific type, and that the first name applied to it (*Actaea rubra*) should be adopted, although published after *Actaea alba*. In this case one would treat the plant of Linnaeus and of Miller as a form of *Actaea rubra*. My own preference is for the second course here indicated.

For the white-fruited plant with thick pedicels and an oblong raceme there is available the very appropriate name *Actaea pachypoda* Ell. (Sketch Bot. 2:15. 1821.)

New York.

New Plants from Oregon

Morton E. Peck

In working over the collections that have been accumulating for many years in the herbarium of Willamette University, a number of apparently undescribed forms have come to the writer's attention that call for recognition. The following is a partial list of these. The type specimens will be deposited in the University of Oregon herbarium.

Juncus saximontanus Wiks. var. **robustior** var. nov. Stouter than the species; stem and leaves strongly compressed, the blades 5–8 mm. wide, the auricles wanting; heads congested into 1—2 close clusters, large and many-flowered; stamens about half as long as the perianth, the filaments longer than the anthers; capsule longer than the perianth.

Type *Peck* 1302, collected near Salem, Ore., July, 1911. There has been much confusion as to the relation of *Juncus saximontanus* to *Juncus ensifolius*. The former is in reality sufficiently distinct. Typical *J. saximontanus* is apparently scarce west of the Cascade Mountains, though common on the eastern side.

Calochortus Galei sp. nov. Stems from narrowly ovoid bulbs, rather stout, 1.5–3 dm. high below the inflorescence, somewhat glaucous, bearing a single leaf; leaves 2–4 dm. long, 10–18 mm. wide, glaucous above; principal bract leaf-like, about equaling the inflorescence; umbel simple or more often bifurcate, the peduncles 7–15 cm. long, 2–3–flowered, the pedicels 4–8 cm. long; sepals oblong-lanceolate, acuminate, 20–30 mm. long, dull greenish white or tinged with purplish; petals pale creamy with a faint greenish tinge becoming dull purplish in age, obovate, sometimes apiculate, 30–40 mm. long, the scale over the gland more or less lacerate, the inner surface densely long-hairy over the basal half, the hairs purple at base, the outer half more sparsely hairy or nearly glabrous; anthers acute, shorter than the filaments; capsule narrowly elliptic, the angles winged, 20–30 mm. long.

Type *Peck* 13719, collected in open dry ground, 4 miles south of Stayton, Linn Co., Ore., May 27, 1925. Most nearly related to *C. Purdyi* Eastw., differing from that species in its greater size and larger flowers with creamy instead of lavender-tinted petals, which are much less pubescent on the outer half.

Ribes Gooddingi sp. nov. A bush 6–10 dm. high with stout, rigid, spreading, somewhat curved branches armed with long, straight, slender yellow spines, solitary below the branchlets, or sometimes 3, the lateral much smaller; internodal spines wanting and young twigs glabrous or puberulent; leaf-blades glabrous or ciliate when young, thickish, nearly orbicular in outline, 8–12 mm. long, deeply 3–cleft, the divisions oblong, divaricate, again 1–2–cleft or merely toothed, the segments obtuse; petioles slender, little flattened, minutely puberulent and sometimes sparsely ciliate, mostly equaling or a little longer than the blades; peduncles 1–2-

flowered, about equaling the petioles, the short pedicels subtended by nearly orbicular scarious bracts; calyx whitish, pink-tinged, finely pubescent without, 4–5 mm. long, the narrowly oblong lobes 3–4 mm. long; petals white, oblong-spatulate, 1.5 mm. long, a little surpassed by the stamens; berry glabrous, dark red, 5–6 mm. in diameter.

Type *William Sherwood* 407, collected 5 miles west of Imnaha, Wallowa Co., Ore., May 30, 1923. Also collected by *W. M. Gorman* 5816, who reported it common on rocky slopes and cliffs, Crooked River, Ore., June 11, 1922. Most nearly related to *R. velutinum* Greene but differing in the scantier pubescence, more slender spines, more slender petioes, longer and narrower calyx lobes and wholly glabrous fruit, and particularly the much narrower leaf-lobes with broad sinuses.

Lathyrus rigidus White var. **pilosellus** var. nov. Differs from the species in having the under surface of the leaves thinly soft pilose, and the flowers smaller, 10–12 mm. long.

Type *Peck* 7869, summit of Horse Mt., 11 miles southeast of McKenzie Bridge, Lane Co., Ore., July 1, 1914.

Hydrophyllum Thompsoni sp. nov. Stems erect, stoutish, more or less branched below, 1.5–4 dm. high, retrorsely pubescent; leaves appressed puberulent, ovate or oblong in outline, 5–10 cm. long, 5–7 parted, the divisions mostly cleft, the segments lanceolate or oblong, mucronate; petioles, except the uppermost, longer than the blades with spreading pubescence; peduncles elongated, erect, equaling or overtopping the leaves; inflorescence densely congested, spherical, sometimes looser; calyx lobes narrowly oblong, very hispid, about half as long as the corolla; corolla bright blue, narrowly campanulate, 7–8 mm. long, the lobes equaling the tube; filaments glabrous.

Type *Peck* 7782, collected near Multnomah Falls, Multnomah Co., April 8, 1914. *J. W. Thompson* 798 from near Bonneville, Columbia Gorge, matches the type. The species differs from *H. capitatum*, its nearest relative, in the narrow leaf-segments and the elongated, stiffly erect peduncles. The habitat of damp shady slopes is also very different from that of *H. capitatum*. This adds one more species to the interesting assemblage of forms nearly or quite confined to the Columbia Gorge.

Phacelia ramosissima Dougl. var. **subglabra** var. nov. Stem stouter than in the species, somewhat fistulose, minutely

cinerous puberulent and very sparingly bristly but not glandular; leaves slightly hispid above; inflorescence slightly glandular; sepals broadly spatulate.

Type *Peck* 9367, collected on a rocky hillside at Keno, Klamath Co., Ore., July 7, 1920.

Phacelia ramosissima Dougl. var. **valida** var. nov. Stem minutely puberulent or nearly glabrous, only the inflorescence glandular and with bristly hairs; sepals narrowly linear-spatulate, in fuit 10–11 mm. long; corolla 7–8 mm.

Type *Peck* 15496, rocky slope near Lakeview, Ore., July 5, 1927.

Veronica Sherwoodii sp nov. A low perennial, the stem persistent and somewhat woody below, diffusely branched, the slender branches ascending or decumbent, 3–8 cm. high, glandular puberulent above; leaves glabrous, 7–15 mm. long, opposite below the floriferous parts of the branches, linear oblong to spatulate-lanceolate, the lower with a few blunt teeth and tapering to slender petioles, the upper entire and sessile; flowers axillary on pedicels shorter than the calyx; lobes of calyx unequal, sometimes strongly so, 3–4 mm. long, narrowly oblong, obtuse; corolla white or changing to pale lilac, about 2.5 mm. long, the nearly equal, ovate, rounded lobes three times as long as the tube; stamens reaching the middle of the corolla, the filaments equaling the anthers; style very short; capsule strongly flattened, sharp-edged, 2–2.5 mm. long, 3–3.5 mm. wide, with shallow apical notch.

Type *William Sherwood* 439, collected at Wallowa Lake, Wallowa Co., Ore., May 24, 1923. Does not seem closely related to any other western species.

Pedicularis centranthera A. Gray var. **exulans** var. nov. Bracts of the inflorescence glabrous or essentially so, the lower similar to the leaves but smaller; otherwise like the species.

Type *Peck* 15668, collected in dry open woods 6 miles northwest of Paisley, Lake Co., Ore., July 17, 1927. The species occurs in the Rocky Mountain region, also in California (?).

Erigeron compositus Pursh var. **submontanus** var. nov. A large stout form, the leafy-bracted peduncles up to 24 cm. high; minutely and densely glandular throughout and loosely hirsute; leaves, including the long, slender petioles, 4–7 cm. long, the blade 3–4 times parted into narrowly linear divisions; involucre 18-22 mm. across; rays 10-12 mm. long, white.

Type *Peck* 14804, collected on a cliff along the Santiam River, 8 miles below Detroit, Marion Co., Ore., April 17, 1927, at an altitude under 400 m. Distinguished from the species by its greater size, more divided leaves, narrower leaf-segments and longer rays.

Hieracium Leachii sp. nov. Stems from slender rootstocks, sparingly hispid with long spreading hairs that are black at base, and below the inflorescence minutely black glandular pubescent and finely pruinose-stellate; leaves all but one or two basal or subbasal, oblanceolate, obtuse or slightly mucronate, obscurely denticulate, thinly hirsute on both surfaces and beneath sparsely stellate, gradually tapering to winged petioles, including the latter 10–16 cm. long; inflorescence congested, of about 5–10 heads, the branches and involucres, hirsute and pruinose; calyculate bracts of involucre minute and fugaceous or wanting, the principal bracts linear, 6–8 mm. long; ligules one-half longer than the involucre, the outer scarlet on the back, the inner orange; akenes black, 10-striate; pappus yellowish.

Type *Lilla Leach* 1025, collected on hills 5 miles southeast of Crown Point, Multnomah Co., Ore., July 17, 1927 at an altitude of about 300 meters. The species is well marked by the character of the pubescence and color of the ligules.

WILLAMETTE UNIVERSITY,
SALEM, OREGON.

BOOK REVIEW

A Guide to the Wild Flowers*

"This book is for those to whom it is difficult, or tedious, or perhaps impossible, to find wild flowers in technical works, and irritating not to find them in 'How To Know' books." The introduction thus gives the plan of the book. Its unique feature is the series of simple keys using very few words that are not understood by everyone. These short keys are numbered and are scattered through the book close to the plants to which they refer, making it a simple matter to find the flower described. Outline drawings on every page make the determination sure. At the end of the book is a finding list based on color,

* Taylor, Norman. A Guide to the Wild Flowers. x + 357 pages, Greenberg, New York. 1928. Price $3.00.

season and location, by which one can, with a little looking up of numbers, run down a plant without the use of keys. A pictorial glossary is a further help.

The nine hundred or more flowers described include most of those to be found in the north eastern U. S. with the exception of grasses and sedges. Trees and shrubs are also omitted. In some of the more difficult groups only a few of the most common or striking plants are described—for example, only 18 members of the Umbelliferae, 18 Asters, 14 Goldenrods. Of course, in a work of this kind it is necessary to limit the number of species described and it is sufficient if all the common species can be found easily and one can be reasonably sure of the genus, at least, of other plants. But it is a little hard to understand why certain common species have not been included; for example 12 violets are given, but *V. conspersa* and *V. rostrata* are omitted; 5 species of *Potamogeton* are given but the very common *heterophyllus* is not given.

Common names are printed in small capitals making them more prominent than the scientific ones, as should be the case in a book meant for popular use. The scientific names used are those of Britton and Brown, where the name in Gray's New Manual is different, the latter is given in brackets.

The book is well printed on good quality paper, bound in semiflexible green cloth. It should have a wide appeal to lovers of the out-of-doors who are not equipped to use the standard manuals.

G. T. Hastings

TORREY BOTANICAL CLUB FIELD MEETINGS

Early spring field meetings of the Torrey Botanical Club, at the New York and Brooklyn botanical gardens were well attended and interesting. On Saturday afternoon, March 31, Mr. Percy A. Wilson guided a party of forty members and guests through the greenhouses and some outdoor exhibits, at the New York Botanical Garden after which they heard Prof. John M. Coulter's lecture on "The Present Status of Evolution." On April 7, Dr. Alfred Gundersen was host at the Brooklyn Botanic Garden to a group of thirty. In the greenhouses, the exhibit on Evolution of Plants proved interesting, with

progressions from water to land, from rhizoids to roots, from small leaves to large leaves, from spores to seeds, and from cones to flowers. On the outdoor walk, there were in blossom these shrubs: *Cornus Mas*, *Jasminumnudiflorum*, *Corylopsis pauciflora*, *Daphne Mezereum*, *Stachyurus chinensis*, and these bulbs: *Crocus vernus* and *moesiacus* and *Scilla sibirica;* and among herbaceous plants *Helleborus foetidus* and *Adonis amurensis*, Work on the new rose garden, the gift of Mr. and Mrs. Walter V. Cranford, which will be opened this spring, was observed.

Raymond H. Torrey

Thirteen members and guests of the Torrey Botanical Club walked across the northern portion of the Hudson Highlands, west of the river, Sunday, April 22, in a drenching rain, that wet through ponchos and "water proofs," before the day was over—yet found much of interest, and after they became inured to the storm, seemed to enjoy the excursion. The trilliums—erectum and cernuum, which the leader, the chairman of the field committee, had advertised as the special attraction, did not perform; spring had been so slow and wet and cold, that only one Wake Robin was found in bloom. Even anemones, and marsh marigold were hesitant in blooming, and hepaticas and spice bush were still in bloom. But arbutus was plentiful and all were pleased to see it increasing in extent, especially along old wood roads in the Stillman Black Rock Forest, where patches ten feet long were common.

The route was from Houghton Farms, on the road from Central Valley to Cornwall, past Green Falls, over Mount Rascal, down Cat Hollow, to the Forest of Dean Iron mines, and down Popolopen Creek to Bear Mountain, where, at the Inn, some of the party, with other wet walkers from the Green Mountain Club, steamed out before the fireplace, and warmed up with hot coffee.

A phenomenon that was odd and new to all the party and which caused much speculation, was evidently due to the drenching rain and would not have been seen on a dry day. Noting patches of foamy bubbles on the bases of white oaks, as large as the plam of one's hand, investigation was made as to the cause. Such frothy patches were found on fully fifty trees,

all white oaks except one, and that an old rough barked red oak. With the rain running off themselves in streams, the members of the party investigated closely and saw that drops of water, gathering on the vertical, slightly concave plates of bark on the white oaks, condensed at the lower tip of the plates, which bend outward slightly and dropped off. Where they struck the butt of the tree two or three feet below, a mass of foam was gathered, constantly renewed as the bubbles burst, by the drops falling from above.

The bubbles had what appeared to be a slightly soapy consistency. Was this effect purely mechanical, or was there some soapiness in the water dripping from the oak bark scales? Could this water be a mild solution of tannic acid and would this be soapy enough to form bubbles when aerated in descent and striking on the bark below? These frothy patches were not seen on smooth barked trees, those with sweet sap, like maples and black birches; the only other species on which they were observed was a rough barked red oak. It was somewhat of an offset to the drenching everyone suffered, to speculate on the cause of these patches of bubbles.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of March 13, 1928

This meeting was held at the American Museum of Natural History, and was called to order at 8:25 p.m. by President Denslow. The following were unanimously elected to membership in the Club:

Dr. Charles W. Ballard, College of Pharmacy of Columbia University, 115 W. 68th St., New York City.

Miss Fanchon Hart, College of Pharmacy, Columbia University, 115 W. 68th St., New York City.

Mr. Victor Lewitus, College of Pharmacy, Columbia University, 115 W. 68th St., New York City.

Mr. Lorens F. Logan, 115 Broadway, New York City.

Dr. William S. Thomas, 1175 Park Ave., New York City.

Miss Helen A. Timmerman, College of Pharmacy, Columbia University, 115 W. 68th St., New York City.

The resignation of Mr. Ludlow Griscom was accepted with regret.

The Secretary read the proposition regarding the election of delegates and representatives to various societies, which had been discussed at the previous meeting and recommended as an article of the Constitution. He also proposed that the second regular meeting in March be held at the Brooklyn Botanic Garden, which was so voted by the Club.

The scientific part of the program consisted of a talk by Professor O. P. Medsger entitled "Experiences of a Field Botanist." Professor Medsger spoke of his early life on a Pennsylvania farm, where he became interested in the identification of plant species. The self-given training in logic, botanical terminology and nomenclature he received through the constant use of Gray's Manual was invaluable. He soon became particularly interested in the seeds of the various species, and now has a collection of 2000 species put up in small vials. It was through detection of differences in the seeds that he was able to distinguish a new species of Cassia which he sent to Dr. J. N. Rose. Dr. Rose suggested the name *C. Medsgeri* for the new species. Professor Medsger urged a more careful study of the seeds of our native plants. By the seed characters just as well as by the floral parts, one should be able to recognize each species. Being in poor health for a time, he was advised to "rough it" in the West, and so assisted Dr. H. M. Hall in his work on the Botanical Survey of the San Jacinto Mountains. Apropos of collections made at that time, he exhibited cones of the two species of Pseudotsuga, and of *Pinus ponderosa* and *Jeffreyi*. *Pinus ponderosa* and *Jeffreyi* are similar, but the latter has a darker bark, and larger cones. Cones of the nut pines and also one of *Pinus Coulteri*, the last weighing three pounds, were shown.

Lantern slides were shown of various plants which the speaker had photographed. The value of a cloudy or rainy day, when, by a long exposure, the pubescence of plant parts can be clearly brought out, was demonstrated. Grasses in flower show to better advantage against a dark background. Other slides, such as the large and small yellow lady's slippers, and the rare ram's head lady's slipper were also projected.

ARTHUR H. GRAVES

Secretary.

Meeting of March 28, 1928

This meeting was held at the Laboratory Building of the Brooklyn Botanic Garden, with Vice-President Gager in the chair. The meeting was called to order at 3:45 P.M. The minutes of the meetings of February 29 and March 13 were read and approved with the alteration noted below.

The Secretary remarked on the proposition made at a previous meeting that the words "in uneven years" be omitted from the article regarding the election of delegates and representatives of the Club to organizations with which it is affiliated, this article to be voted on at a subsequent meeting. It was voted by the Club that the minutes be altered by the omission of these words.

Mr. Harold C. Bold, 435 W. 117th St., New York City, was unanimously elected to membership.

The scientific part of the program consisted of a lecture by Dr. George M. Reed entitled "Physiologic Races and the Inheritance of Resistance in the Cereal Smuts." An abstract of this lecture prepared by Dr. Reed follows:

"The discovery of physiologic races of smuts greatly complicates the problem of breeding for smut-resistant varieties of cereals. Our recent investigations have demonstrated the existence of at least four well-defined races of *Tilletia laevis* and six of *T. Tritici*. These races are separated on the basis of their behavior on such wheat varieties as Martin, Odessa, Hussar, Turkey and Kanred. While most varieties of winter wheat grown in the experiments have proved to be very susceptible to practically all the collections of bunt, yet these five varieties have shown a variation in their susceptibility or resistance to the different collections. By their use it has been possible to demonstrate that distinct races of both species of bunt or covered smut of wheat exist. Some of these are especially characterized by their ability to infect Martin, Odessa and Hussar, varieties which hitherto have had a reputation for great resistance to bunt.

In all of our experiments with loose and covered smut of oats, the varieties Fulghum and Red Rustproof have consistently been resistant. This was particularly true when

the original collections of smut obtained from Missouri were used for inoculation. These two varieties are grown quite extensively as winter oats in the southern part of the United States. In recent years the variety Fulghum particularly has been grown by the agronomists, and selections obtained which are well adapted to the southern area of the spring oats region. Some of these selections have shown a high agronomic value. One of the strong points in connection with the variety Fulghum has been its resistance to smut. However, we have recently discovered that there is a race of *Ustilago Avenae* which causes severe infections on Fulghum, as well as some other varieties. A distinct race of this same smut has been demonstrated to occur on the Red Rustproof. Consequently, these varieties can not be considered as resistant to all races of smut, but only to certain ones.

There is a large number of other races of oat smuts differentiated on the basis of their reaction to different varieties. Similarly, there is a number of races of the covered smut of barley.

These physiologic races are recognized by their capacity for infecting known varieties of the host. Their behavior is definite and specific. A given variety may possess complete resistance to one race of smut and at the same time be highly susceptible to another. Consequently, in the study of the inheritance of smut resistance, we must use definite specialized races of smuts as well as pure lines of the host varieties.

When known races of smut as well as pure lines of the hosts are used, quite definite results on the inheritance of smut resistance are obtained. A number of crosses between Black Mesdag, very resistant, and Hull-less, very susceptible to both the Missouri races of loose and covered smut of oats, have been studied. In the second generation, out of 465 plants inoculated with loose smut, 107 (23 per cent) have been infected. In a similar series with the covered smut 196 plants were inoculated and 40 (20.4 per cent) infected. Crosses between such varieties as Early Gothland and Hull-less, in which both varieties are susceptible to loose smut, while Early Gothland is resistant to covered smut, have yielded interesting results. The F_2 plants inoculated with loose smut have practically all been infected, while of the 94 plants inoculated with covered smut, 37 (39.3 per cent) have been infected.

Similarly, the varieties Monarch and Hull-less are both susceptible to covered smut while the former is resistant to the loose smut. In the second generation of crosses between these varieties, practically all of the plants inoculated with covered smut have been infected, while of 196 plants inoculaated with loose smut 41 (20.9 per cent) plants were infected."

At the conclusion of the lecture, Dr. Harper remarked that the data which had just been presented in a most able manner were at least in part the data forming the basis of the paper which won the A. Cressy Morrison Prize for 1927, offered for the most acceptable paper in a field of science covered by the New York Academy of Sciences or an affiliated Society. He believed that the Club had not yet taken formal recognition of this award, and felt that the Club was to be congratulated on the fact that the prize had been won by one of its own members.

In the discussion of Dr. Reed's paper which followed, Dr. Barnhart inquired if any studies were being made looking toward the possibility of morphological distinctions being present in the physiologic races. Dr. Reed replied that one of his former assistants, who is now at Syracuse University doing graduate work, is studing this phase. Since these smuts are readily cultured, it may be possible to distinguish between them on the basis of their cultural characters. Dr. Trelease asked if all of the seedlings in a pure line variety would get infected. Dr. Reed answered that practically every pure line variety of oats, if it is susceptible, should yield 100 per cent of infection. However, environmental conditions modify the degree of infection more or less—occasionally the results being 90 or 95 per cent infection. Dr. Gundersen and Dr. Barnhart remarked on the possibility of the species being liable to change. Dr. Reed stated that the chances are that races of smuts are developing about as fast as varieties of cereals.

Arthur H. Graves.
Secretary.

Meeting of April 10, 1928

This meeting was held at the American Museum of Natural History, being called to order at 8:25 P.M. by Vice President Hazen. By unanimous vote, Mr. Hans Wilkens, 241 South 11th Street, Reading, Pennsylvania, was elected to membership in the Club.

By vote of the Club, according to a recommendation of the Finance Committee, Mrs Trelease was authorized to sell the Third U. S. Liberty Loan bond of $1000, owned by the Club, and deposit the proceeds in the Central Savings Bank, 14th Street and 4th Avenue, New York City.

The scientific part of the program consisted of an illustrated lecture by Dr. A. B. Stout, entitled "Dichogamy in Flowering Plants." For an account of this subject, reference may be made to Dr. Stout's recent paper, which appeared in the Bulletin of the Torrey Botanical Club for March, 1928, pp. 141–153.

Arthur H. Graves.
Secretary.

NEWS NOTES

Dr. Fred J. Seaver will issue this year a monograph on the North American Cup-fungi (Operculates). It will be a book of 250-300 pages with colored plates and text figures. It will be the only American monograph of this group of fungi and will be based on over twenty-five years of study. The volume is being published at the expense of the author and the edition will be a limited one. Orders may be placed now with the author at the New York Botanical Garden, Bronx Park, New York.

After nine months absence on a "Quest for grass," L. W. Kephart and R. L. Piemeisel, plant explorers of the U. S. Department of Agriculture, have just returned from Africa with more than 160 lots of seed of grasses and forage plants and 400 specimens of other plant life. The two grass hunters tramped more than 300 miles through the highlands of Kenya

and Tanganyika, formerly known as British East Africa and German East Africa, collecting seed of every promising plant.

Traversing much of the country on foot, the explorers were constantly attended by native hunters to protect them from wild animals. The country is attractive to hunters and many go there to kill big game. They often leave wounded animals in their wake, and these are most dangerous to men who follow.

Not all of British and German East Africa is wild, however. In fact, this comparatively small area is as varied in climate, soil, and natural vegetation perhaps as the entire continent. It is literally packed with things to delight the plant explorer.

More than 10,000 Europeans are now farming in this area. In parts of Kenya where the Equator crosses, Europeans are raising a high-quality hard wheat. It is one of the few places in the tropics where wheat is grown. It is not uncommon to see in the gardens of these settlers a geographical mixture of vegetation—beans growing beside bananas, pineapples along with potatoes, and cotton with cucumbers.

Professor John W. Harshberger, of the botanical department of the University of Pennsylvania, will visit Algeria, North Africa, this summer, crossing the Atlas Mountains to the northern part of the Sahara Desert to the oases of Biskra, Colomb, Bechar and Touggourt. En route, he will visit the forests of Atlas cedar. Leaving North Africa, he will proceed via Naples, Rome and Leghorn to the Island of Corsica, to acquaint himself with its flora. Homeward bound, he will cross the French Alps from Nice en route to Paris.

According to Museum News, the first arboretum in West Virginia will be established at Wheeling. It will cover an area of approximately 70 acres and will include several miles of trails, along which signs and labels will be placed to instruct visitors in natural history.

Dr. Joseph Nelson Rose, associate curator of botany in the U. S. National Museum, died on May 4, aged 66 years.

The Department of Botany of Rutgers University has recently come into possession of a valuable and historic herbarium, that of Dr. P. D. Knieskern, who about the middle of

last century made one of the earliest collections of the native plants of New Jersey. Dr. Knieskern's home for some years was at the town we now call Lakehurst, so that his collecting was done chiefly in the southern part of the state. In 1856 he published a catalogue of the plants of Monmouth and Ocean counties. After his death his collection passed through several hands, finally becoming the property of Dr. H. H. Rusby, Dean of the College of Pharmacy of Columbia University, who presented it to Rutgers. Just how many thousands of specimens the collection contains it is impossible to say at present, but an examination of a few bundles shows that Knieskern made extensive exchanges with other collectors, thereby enriching his herbarium. But the most important feature of the collection is that it forms an authentic record of the flora of southern New Jersey.

The Phi Sigma Society has announced that it will offer a scientific program at the New York meeting of the A. A. A. S. on December 27 of this year—a program which will be open to junior research workers, whether members or not, in any field of biological science. A prize of at least $50 is offered by the Council of Phi Sigma for the most meritorious paper presented on such a program by a non-member. Those wishing to present papers should report their intention to the Secretary, Dr. C. I. Reed, Baylor University, Dallas, Texas, not later than Nov. 15, 1928, and should submit a brief abstract not exceeding 250 words. Authors need not be present but may delegate the reading of a paper to some one who will be in attendance. Papers will be limited to 10 minutes. So far as possible all papers of merit will be admitted to the program.

A public hearing to consider the advisability of quarantining New York State on account of the Woodgate rust, a dangerous disease attacking Scotch pine and presumably other hard pines, which has recently been established in various parts of that State, will be held at 3:30 P.M. on June 27, 1928, at Washington, D. C., before the Federal Horticultural Board, United States Department of Agriculture.

The disease, which is apparently both new and dangerous, was first found on Scotch pine at Woodgate, N. Y., and for

this reason has been called the Woodgate rust. It is an infection which attacks the host with almost unprecedented virulence. For example, one tree 15 feet high was found by actual count to have over 18,000 galls. The parts of the tree above the galls either die (always, if the trees are young) or, if life continues, "brooms" are produced which dwarf the tree and ruin it for timber. The rust has been proved to have the capacity for spreading directly from tree to tree without the intervention of any alternate host. This peculiarity will probably make it particularly dangerous and difficult to control. While Scotch pine is a tree of great value for reforestation in the Northeastern States, especially in light, sandy soils, the danger from Woodgate rust lies less in its damage to that species than in its potential menace to all hard pines, which include some of the most valuable forest trees in America.

The public hearing on account of the Woodgate rust is called to follow immediately the conference on account of the white pine blister rust, for convenience of persons who may wish to attend both.

THE TORREY BOTANICAL CLUB

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All persons interested in botany are invited to join the Club. There are two classes of membership: *Sustaining*, at $15.00 a year, and *Annual*, at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Torreya is the Official Organ of the
Wild Flower Preservation Society of America

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Matter for publication, and books and papers for review, should be addressed to

GEORGE T. HASTINGS
2587 Sedgwick Ave.
New York City

Vol. 28 July-August, 1928 No. 4

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

CONTENTS

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TORREYA

Vol. 28 No. 4

July-August, 1928

Isotria verticillata on Staten Island, New York

Arthur Hollick

Twenty-five species of orchidaceous plants have been recorded from Staten Island. Most of them were relatively common, some of them were locally abundant, a generation ago. In recent years, however, several of the species have disappeared, others are on the verge of extermination, and the remainder may now be listed as either occasional or rare.

Isotria verticillata (Willd.) Raf. (=*Pogonia verticillata* (Willd.) Nutt.) was collected on Staten Island in the early '70s, according to a specimen in the local herbarium of The New York Botanical Garden, labeled "Huguenot, S. I., W. H. L[eggett], May 30, 1871"; and specimens were subsequently collected at Gifford's—about two and three quarters miles distant from Hugenot—both by me and by Dr. N. L. Britton. The Huguenot station for the species, mentioned by Leggett, was never located by us. Specimens were obtainable in the vicinity of Gifford's, however, until about 1890, and possibly later; but search of the locality in recent years failed to reveal the presence of any plants.

About a year ago Mr. H. Papke collected specimens at Annadale, an intermediate station about a mile from Huguenot and a mile and three quarters from Gifford's. I visited this locality on May 29, 1928, and, with the aid of a sketch map prepared by Mr. Papke, had no difficulty in finding the plants. They were growing in considerable number in an irregular zone, around the border of a drained and partly filled-in pond hole, in a section of recently cleared woodland through which streets have been cut and graded, in connection with a piece of real estate development. Many plants were probably destroyed by the cut and fill of two of the intersecting streets. Twenty-eight, however, were counted within an area of approximately 20×10 feet, and a number of scattered specimens were observed but not counted, beyond the obscurely delimited outer edge of the zone of distribution. No attempt was made to ascertain

the full distributional extent or limits. The plants are, apparently, doomed to extermination in the near future, not only by reason of the destruction wrought in their natural environment, but also because further artificial development of the locality is inevitable, and it is hopeless to expect that the native vegetation will receive any consideration.

Through the courtesy and skill of Mr. H. C. Hartmann excellent photographs were secured of a group of the plants in mass, and also of certain individual plants, as may be seen from the accompanying plates.

New York Botanical Garden.

Explanation of Plates

Plate A

A group of nine plants of *Isotria verticillata* at Annadale, Staten Island, N. Y.

Plate B

Individual plants at the same locality

Figure 1. A flowerless and a flowering plant—the latter showing the flower in profile.

Figure 2. A plant showing front view of the flower.

Photographs by Mr. H. C. Hartmann.

Note. Since writing the above I again visited the locality, on June 10, and found a large section of the woodland destroyed by a brush fire. The fire had, fortunately, stopped when it had eaten its way to about the middle of the *Isotria* zone. Had it gone twenty feet further every plant would have been exterminated.—A. H.

Flower Structures of Dicotyledons

Alfred Gundersen

The semi-diagrammatic representations opposite are intended to indicate in a condensed form varied floral characters; *Amentiferae* are omitted.

Probable lines of evolution of the characters shown may be briefly summarized.

Carpels and seeds

from separate to partly united, to wholly united;

Plate A

Fig. 1.

Fig. 2.

Plate B

from ovary superior to half inferior, to wholly inferior;
from placentation axile to parietal or central;
from many seeds to few.

These are, in general, changes in the direction of greater care of the next generation.

Stamens

from numerous to two whorls, to one whorl;
(indicated, respectively, by three, two or one figure on each side of the flower);
from separate to united,
(by cohesion of filaments, or of anthers, or by adhesion to petals).

With more effective methods of pollination, less pollen is needed.

Petals (indicated by dotted lines):

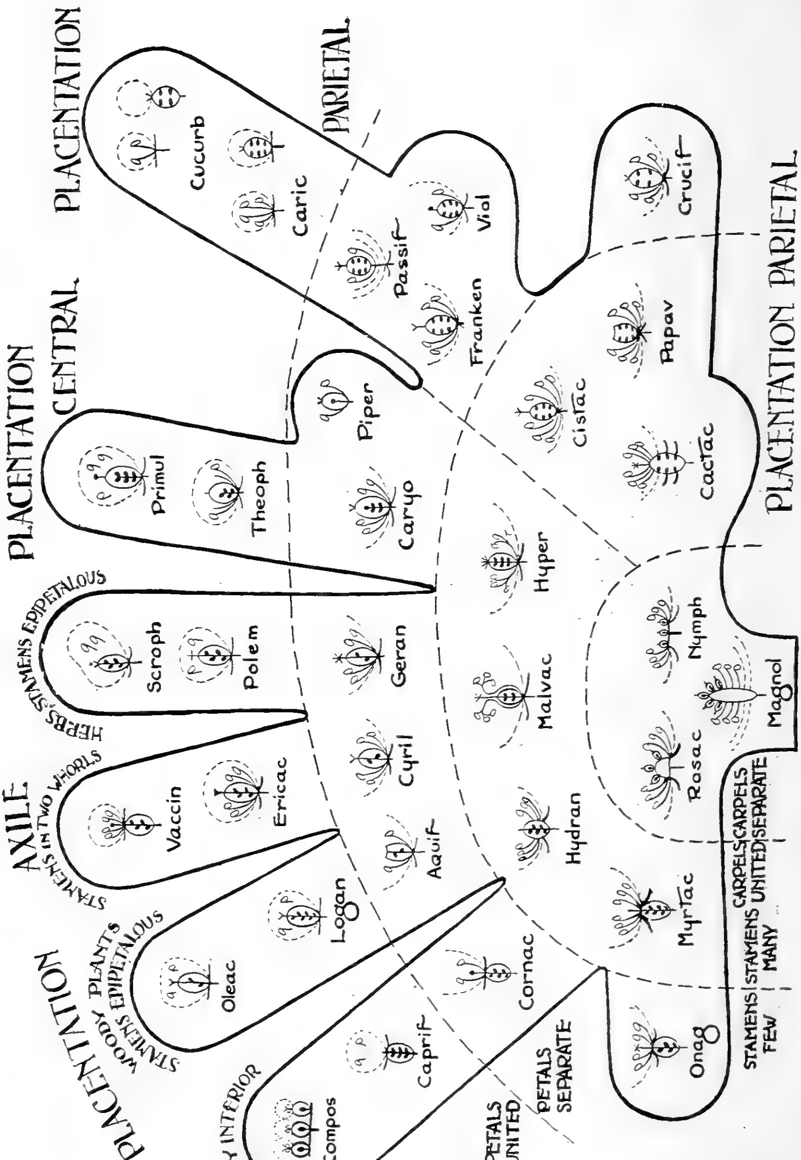
from separate to united;
from regular to irregular.

These are changes in the direction of increasing adaptation to insect visitors.

On page 74, Torreya, July-August, 1926, is a diagram of the Evolution of Dicotyledons according to Hutchinson. Though not adopting the main division into woody and herbaceous plants, the diagram opposite in other respects is not altogether different.

In the Engler system, the group Parietales appears to occupy a somewhat advanced position. This, however, must be considered as due to the requirements of a linear sequence, as this group connects so closely with the Magnolia group. Similarly the great family, *Myrtaceae*, is here placed nearer the base. This appears to make other connections more natural, and thus Australian plants, as well as animals, may be in general more primitive.

For the definition of species, nomenclatorial types are important. From the point of view of the classification of families the idea of structural types is of chief concern. Early systematists often reversed families, as when *Cactaceae* were begun with Cereus, or *Gramineae* terminated with Bambusa. Thus groups were, so to speak, suspended without any connecting link with others. It is important to know what is the essential



PLACENTATION PARIETAL
PARIETAL
PLACENTATION
PLACENTATION CENTRAL
PLACENTATION PARIETAL
AXILE
PLACENTATION
STAMENS IN TWO WHORLS
HERBS, STAMENS EPIPETALOUS
WOODY PLANTS STAMENS EPIPETALOUS
OVARY INTERIOR
PETALS UNITED
PETALS SEPARATE
STAMENS FEW
STAMENS MANY
CARPELS UNITED
CARPELS SEPARATE
Cucurb
Caric
Passif
Viol
Crucif
Franken
Papav
Piper
Cistac
Cactac
Primul
Theoph
Caryo
Hyper
Nymph
Scroph
Polem
Geran
Malvac
Magnol
Vaccin
Ericac
Cyril
Rosac
Aquif
Hydran
Logan
Myrtac
Oleac
Cornac
Caprif
Onag
Compos

or primitive type of various families, and especially of groups of families or orders.

We see how comparatively primitive forms of plants and animals have persisted through geological ages alongside with the evolution of higher groups. We may well believe that also in the flowering plants primitive forms persist in the various groups. Improved knowledge of fossils, of development, of comparative morphology of related families, will establish these forms; from the present diversity of opinion true ideas as to the actual course of plant evolution will doubtless gradually emerge.

Brooklyn Botanic Garden

Revision of the Genus Crocidium*

Harold St. John

Among the many unique and interesting plants discovered in Northwest America by David Douglas, was a little yellow annual Composite. He found it near Fort Vancouver, now Vancouver, Washington, on the Columbia River. From there upstream for a hundred miles it is one of the commonest early spring flowers. Though the individual plants are small and few flowered, it grows in such abundance on the sandy flats near the river as to change their color from the pale yellow of the sands to the rich golden yellow of the flowers. Sir. W. J. Hooker described this plant as a new genus and species, *Crocidium multicaule* during the very year of the tragic death of Douglas in the Hawaiian Islands. Since its publication in 1834, *Crocidium* has remained a monotypic genus.

The first hint that there might be more than one species involved came while making some dissections for drawings. A study of both fresh and dried material available soon added evidence. The writer then asked the loan of material from other herbaria, and here wishes to gratefully acknowledge this courtesy and assistance from the curators of the following herbaria. The abbreviations listed are used in the citation of specimens to indicate the herbarium in which they can be found.

* Contribution from the Botany Department of the State College of Washington, No. 14.

(BC) Provincial Museum of Natural History, Victoria, B. C., Canada.

(G) Gray Herbarium, Harvard University, Cambridge, Mass.

(O) University of Oregon, Eugene, Ore.

(OAC) Oregon Agricultural College, Corvallis, Ore.

(S) W. N. Suksdorf Herbarium, Bingen, Wash.

(WSC) State College of Washington, Pullman, Wash.

(WU) Willamette University, Salem, Ore.

Crocidium pugetense St. John, n. sp., small annual herbaceous plant, 0.5–2.5 dm. high; stems one to several, slender, terete, glabrous but for the tuft of wool in the leaf axils, naked and scape-like above; basal leaves numerous and rosulate, spatulate somewhat fleshy, entire or dentate, glabrous; cauline leaves clothing the lower half of the stem, small linear entire or somewhat dentate or lobed, glabrous except for the conspicuous tuft of wool in the axil, 3–15 mm. long, about 1 mm. wide; heads hemispherical; bracts 9–12, oblong- or ovate-lanceolate, connate below, in one series but the bases of each alternate one overlapping the intervening ones, lanate at the tip otherwise glabrous, 4–7 mm. long, 2–3 mm. broad; ray-flowers as many as the involucral bracts, yellow pistillate, achenes narrowly and asymmetrically ellipsoid, 5-ribbed, crisp-puberulent between the ribs, these hairs on wetting emitting mucilaginous spiracles, 2 mm. long, pappus wanting, corolla tube slender, distended at base, 1.5–2.3 mm. long, the blade elliptic-lanceolate, 7–10 mm. long; disc-flowers yellow numerous, achenes oblanceolate-ellipsoid 5-ribbed brown, crisp puberulent between the ribs, the hairs on wetting emitting mucilaginous spiracles, pappus bristles scaberulous, about 30, white, persistent or tardily deciduous, equaling the corolla, corolla tube very slender, almost filiform, distended at base, 0.1–0.2 mm. wide, 2–4 mm. long, limb campanulate, the lobes erect or slightly spreading, 2.2 mm. long, stamens and stigmas well included in the throat.

Herba annua, floribus ligulatis cum tubo filiforme nudo, floribus disci cum setis scaberulis, tubo filiforme 2–4 mm. longitudine.

British Columbia: Saanich Arm, Vancouver Island, May 6, 1919, *J. R. Anderson* (WSC); Mount Finlayson, May 6, 1908, *J. Macoun* 88378 (G; BC); rocks, Saanich Arm, April 19, 1897, *J. R. Anderson* 207 (BC); sea beach, Parksville, May 4, 1900, *J. R. Anderson* 207 (BC); on rocks, Shawanigin Lake, April 24, 1915, *M. St. Barbe* 5113 (BC).

Washington: sandy banks, Whidby Island, April 17, 1897, *N. L. Gardner* 183 (Type in Herb. State College of Washington); Orcas Island, Oregon

Boundary Commission, 1858, *Dr. Lyall* (G); prairie, Tacoma, April 1, 1896, *J. B. Flett* 79 (WSC); Washington Territory, *Dr. Cooper* (G). (In Cooper's report, Pac. R. R. Repts. 12: pt. 2, 65. 1860, he states that he found this species at Straits de Fuca, and at Steilacoom. It is still known at the latter place, but has not been recollected at the Straits.)

✓ **C. multicaule Hook.,** Fl. Bor. Am. 1: 335, Tab. CXVIII. 1834. This original species follows the Columbia River from Vancouver up at least as far as Kennewick, up the Umatilla River to the foothills of the Blue Mts., up the Walla Walla River to Touchet, up the Touchet River to Waitsburg, up the Yakima River and its tributaries as far as Cowiche, and ten miles beyond Ellensburg. It is found at Baker City and in southern Oregon, and from a half dozen stations in central and northern California. The various collections from southern Vancouver Island and from Puget Sound are here separated as a distinct species. This destroys one of those interesting cases of Arid Transition plants reported to occur on the sandy prairies in western Washington, with the great barrier of the Cascade Mts. and the humid evergreen forest lying between. Yet, it leaves each of the species with a natural distribution. The original species, *Crocidium multicaule* can be recognized by its ray flowers with scaberulous pappus bristles equaling the corolla tube and early deciduous, the disc flowers with similar pappus scarcely exceeding the tube, the tube short and cylindrical, but distended at base when dried, 0.4 mm. wide, 1–1.6 mm. long, the campanulate limb 1.4–1.6 mm. long with reflexed lobes, and the stamens and stigmas well exserted from the throat. The writer is quite aware that Hooker originally described this genus and species as having the ray achenes naked, "*radii* nuda" on page 335, and so illustrated them, (Fl. Bor. Am. 1: tab. CXVIII, fig. 6. 1834); and that this treatment has been followed and maintained by A. P. de Candolle, Gray, Bentham & Hooker, Engler & Prantl, Howell, Piper & Beattie, Rydberg, and Jepson. Through the courtesy of Dr. B. L. Robinson it has been possible to borrow and study the material of this genus in the Gray Herbarium. This includes one collection of three small plants labeled Crocidium multicaule, Fl. Bor. Am., Hooker misit, Januar. 1835; and another of one medium sized plant labeled Crocidium multicaule Hook., Oregon (Hooker!). These are old, fragile, and somewhat damaged by insects, but they clearly are of the species so common on the Columbia River, and with the characters listed above. They are unquestionably portions of the type collection. Furthermore, though Douglas ascended the Chehalis River and portaged to the Cowlitz, he did not on his first trip to the Pacific Northwest reach Puget Sound, or Vancouver Island, where *C. pugetense* is now known to occur. The new *C. pugetense* may be distinguished by its ray flowers destitute of pappus, the disc flowers with

white scaberulous pappus equaling the corollas, the tube very slender and almost filiform but distended at base, 0.1–0.2 mm. wide, 1.5–4 mm. long, the campanulate limb 2.2 mm. long, with the lobes erect or slightly spreading and the stamens and stigmas well included in the throat.

The following specimens of *C. multicaule* have been examined:

WASHINGTON: Hooker misit, Fl. Bor. Am., Januar. 1835 (*David Douglas*, Fort Vancouver) (G); Cowiche ridge, Yakima Co., April 1, 1923, *Elias Nelson* 1210 (WSC); Ellensburg, April 7, 1897, *K. Whited* 262 (WSC); dry east slope, Foothills of Blue Mountains, May 1, 1897, *R. M. Horner* 165 (WSC); hillsides, Waitsburg, May 7, 1898, *R. M. Horner* R165B298 (G); near Ellensburg, May 4, 1896, *K. Whited* 64 (WSC); dry sagebrush flat, alkaline, Touchet, Walla Walla Co., April 5, 1923, *H. St. John, W. J. Hardy, F. Warren* 9283 (WSC); dry rocky slopes near Walla Walla River, Reese, Walla Walla Co., April 5, 1923, *H. St. John, W. J. Hardy, F. Warren* 9284 (WSC); Stevenson, Skamania Co., March 28, 1927, *Nancy Wallace* (WSC); dry side hill, Ellensburg, April 8, 1898, *K. Whited* 607 (OAC); hillsides, Columbia River, W. Klickitat Co., April 4, May, 1882, *W. N. Suksdorf* 373 (S; O); Lake River, Clark Co., April 12, 1894, *W. N. Suksdorf* 9923 (S); rocks, river bank, Bingen, Klickitat Co., April 24, 1899, *W. N. Suksdorf* 9978 (S); on Bingen Mt., lower part, Klickitat Co., April 15, 1918, *W.N. Suksdorf* 10008 (S); Rockland, Klickitat Co., May 10, 1899, *W. N. Suksdorf* 9983 (S); steep grassy slopes, 1200 ft., Mt. Hamilton, May 27, 1919, *M. W. Gorman* 4523 (WSC).

OREGON: The Dalles, Wasco Co., April 4, 1902, *E. P. Sheldon* 10015 (WSC;G;O); moist bank, The Dalles, April 7, 1914, *M.E. Peck* 3986 (G); Hermiston, spring 1919, comm. *J. H. Lovell* (G); on the Umatilla River in the Blue Mts., April 4, 1910, *W. C. Cusick* 3412 (G; WSC; WU); on rocks, Dalles, April 11, 1903, *J. Lunnell* 15 (G); Oregon, *Nuttall* (G); Oregon, Hooker, (probably either *Douglas* or *Nicholas Garry*) (G); on moist prairies, Mosier, April 15, 1892, *T. J. Howell* 742 (WSC); Hood River, June 1, 1883, *Mrs. Dr. Barret* (G); Baker City, 1875, *R. D. Nevius* (G); hills north of Corvallis, Mar. 26, 1911, *L. H. Griffin* (OAC); stony soil, sagebrush, 4800 ft., Horsefly Valley, Lorella, May 20, 1917, *J. O. Stewart* 20 (OAC); common, Pacific Coast Plants, April 15, 1881, *T. J. Howell* (OAC); on open hillsides, Eastern and Southern Oregon, April 10–May 6, 1886, *L. F. Henderson* 540 (OAC); sandy and rocky slopes, Hood River, April 16, 1922, *M. W. Gorman* 5602 (WSC); Ashland Butte, May 6, 1887, *L. F. Henderson* (O); moist hillside, Eugene, April 24, 1906, collector unknown (O); Latourelle Falls, Multnomah Co., April 21, 1903, *E. P. Sheldon* 11917 (O); Devil's Canyon, near Bridal Veil, Columbia River, April 20, 1889, *L. F. Henderson* (O); Trail, Feb. 12, 1927, *Wm. Sherwood* 969 (WU); Madras, Jefferson Co., March 29, 1924, *M. E. Peck* 13170 (WU); mouth of Des Chutes River, April 1915, *S.G. Jewett* 6749 (WU); moist bank along Columbia River, The Dalles, April 7, 1914, *M. E. Peck* 3986 (WU); Ashland, March 1924, *Wm. Sherwood* 13498 (WU); open ground, Grants Pass, April 9, 1910, *Gerald Prescott* 1382 (WU); Hood River, April 3, 1926, *J. W. Thompson* 666 (WU); La Grande, March 15, 1926, *Ben Bailey*

736 (WU); Forest Grove, *Jos. W. Marsh* (WU); Myrtle Creek Canyon, Douglas Co., April 7, 1927, *J. W. Thompson* 2049 (WU); Summit of the Siskiyou Mts., south of Ashland, April 11, 1927, *J. W. Thompson* 2189 (WU).

IDAHO: The species is commonly credited to this state. No evidence to confirm this exists in the U. S. National Herbarium, the New York Botanical Garden, or any of the herbaria cited. The only possible specimen seen is one from Clear Water, Oregon, *Rev. Mr. Spalding* (G). The plant has not been found since near Fort Lapwai or Spalding, Idaho, where Mr. Spalding lived and collected most of the specimens. However, he made several trips to Walla Walla to visit his friend and fellow missionary Whitman. It seems likely that Spalding found the plant on one of these journeys, as the plant is extremely abundant and showy in the vicinity of Walla Walla and along the Touchet River. It is unlikely that if this attractive little plant grew in the region of Lapwai, that it would have escaped the attention of the considerable number of botanists who have lived and worked in Pullman, Wash., or Moscow, Idaho. *Balsamorhiza Careyana* Gray presents a similar case. Dr. Gray described it from a Spalding specimen, labeled "Sandy plains, Clear Water, on the Kooskooskie." This big showy Balsamroot does not now grow nearer than the mouth of the Palouse River, about a hundred miles to the westward. All of the specimens collected by the Rev. Mr. Spalding were given the uniform printed label, "Clearwater, Oregon."

CALIFORNIA: common on barren spots, Kneeland Prairie, altitude 2500 ft., May 4, 1913, *J. P. Tracy* 4048 (G); Red Mt., Mendocino Co., May 21–28, 1902, *Alice Eastwood* (G); Surprise Valley, N. E. Cal. *Lemmon* (G); Camp Blaisdell, 1879, *Dr. W. Matthews* (G); Lassen Co., June 1878, *Mrs. R. M. Austin* (G); abundant, miles of plains and hillside yellow with it, from April 1, Yreka, Siskiyou Co., April 18, 1876, *E. L. Greene* 703 (G); Mariposa, April 1888, *J. W. Congdon* 501 (G).

STATE COLLEGE OF WASHINGTON, PULLMAN, WASHINGTON.

BOOK REVIEWS

Common Wild Flowers of Pennsylvania*

Having previously acquired an expert knowledge of the flora of Western Pennsylvania, Dr. Gress became State Botanist in 1920 and has since become well qualified to make a judicious selection of the representative common wild flowers of the State. The "Common Wild Flowers of Pennsylvania" is an attractively printed, paper bound book of 121 pages, illustrated by a plate of plant and flower parts and by 61 half-tones of flowers

* Common Wild Flowers of Pennsylvania. Ernest M. Gress, Ph.D. Times Tribune Co., Altoona, Pa. 121 pp., 5¼ by 8 in., paper bound. (75 cts. postpaid.)

or flowering plants. Most of the photographs were taken by Attorney Geo. B. Parker, of Pittsburgh, an enthusiastic flower photographer whose exquisitely colored lantern-slides are well known around western Pennsylvania.

Dr. Gress intentionally makes the book "as simple and free from technical terms as scientific accuracy will permit" and it should be interesting and useful to high-school pupils, scouts, and to the general non-technical public. General directions are given about collecting, pressing, mounting, and studying plants; the general structure and life-cycle of the plant is simply discussed, and then follow the descriptions of the various species. In connection with the descriptions and pictures of the plants are included accounts of insect visitors, economic uses, medicinal or poisonous properties, peculiarities of growth, habitat, or flower structure—in fact, just the interesting things that most people want to know about, after they find out what the plant is.

O. E. Jennings

Durand's Field Book of Common Ferns*

No group of plants better repays study than the ferns. A small group, one can become familiar with nearly all the species of any region in one summer. Succeeding years will add a few rare species or various new forms of familiar species. To help make a hobby of ferns or just to scrape acquaintance with them, there has recently appeared a new volume of Putnam's Field Books. This has been made as simple as possible,—possibly too simple for anyone who already knows something of the ferns. Only nine scientific terms are used, including midvein, spore-case, fruit-dot and habitat. Sporangium and sorus might have been used instead of the corresponding terms without making the book too technical and certainly the indusia should have been described, even if under some other name.

Fifty species of ferns are described and illustrated. There is a beautiful set of habitat pictures from photographs of the ferns as they grew, often with a wild flower of some kind at the side. In addition there are habitat photographs of four of

*Field Book of Common Ferns, Herbert Durand. 219 pages. 1928. G. P. Putnam's Sons. $2.50.

the club mosses, though these are not included in the descriptive part of the book.

For each fern there is a full page outline drawing of the whole frond with enlarged details of the pinnules to show the sori. Facing each plate is a page of description with paragraphs on the frond, fruit-dots, rootstock, habitat, range, distribution and general notes. At the end of the book are short chapters on making a fern herbarium, growing ferns in the home or in the open, raising them from spores, etc. The common names used are those of Standardized Plant Names, the botanical names are those of the seventh edition of Gray's Manual, or the ones to be used in the new eighth edition. Synonyms are given in the back of the book instead of with the descriptions, an arrangement that will appear simple to beginners, but annoying to others.

But the only real fault to find with the book is in the omissions. A simple key would be of great value. At present the only way of determining a fern in this field book is to match it up with the pictures. While adding to the size and scope of the book, the inclusion of a dozen of the fern allies would have helped familiarize these rather neglected plants. In size and general appearance the book is similar to others of the Field Books, which means that it is small enough for a coat pocket, well bound and carefully printed. The book should add largely to the number of fern lovers.

George T. Hastings

PROCEEDINGS OF THE CLUB

Meeting of April 25, 1928

This meeting was held in the Museum Building of the New York Botanical Garden. The minutes of the meetings of March 28 and April 10 were read and approved. Mr. Charles E. Raynal, The Manse, First Presbyterian Church, Statesville, N. C., was elected to membership.

By unanimous vote of the Club, the following new article of the Constitution was approved, to be Article XIX; the final article in the Constitution, relating to "Amendments," to be renumbered Article XX.

Article XIX. Election of Delegates

Delegates and representatives on the councils of the New York Academy of Sciences and the American Association for the Advancement of Science, and other organizations with which the Club shall become affiliated, shall be elected at the Annual Meeting in January, the numbers of such delegates and representatives to be elected, depending on the quota regulations of such organizations.

Pursuant to the action of the Club at the meeting of February 29, regarding Article XVIII of the Constitution relating to the time of meetings, this article was now amended by unanimous vote by omitting the part relating to the regular meetings. The article so amended reads therefore as follows:

Article XVIII. Annual Meeting

The first regular meeting in January shall be the Annual Meeting. Nine members shall constitute a quorum for the transaction of business.

Also, in accordance with the action of the Club at the meeting of February 29, the following new By-Law was unanimously passed, to be known as III, the succeeding By-Laws to be renumbered in regular sequence as necessitated by this insertion.

By-Law III. Meetings

Unless otherwise determined by the Club, the regular meetings shall be held on the first Tuesday and the third Wednesday of each month from October to May, inclusive, except the third Wednesday of December, at such time and place as the Club may direct. Nine members shall constitute a quorum for the transaction of business. The President may call special meetings upon his own motion.

The President announced his appointment of Mr. Raymond H. Torrey to represent the Club on the Coordinating Council of Nature Activities.

Mr. Torrey reported for the Committee on the establishment of a permanent field headquarters, that he had made arrangements for two week-end outings, namely June 23–24, and September 22–23 at the Inkowa Club Hotel at Greenwood Lake, New York. This had been arranged as an experiment to see whether this location might be looked upon as favorable for permanent field headquarters.

The scientific program consisted of a talk by Mr. Torrey, entitled, "Observations on Highland Plants."

Mr. Torrey said that in the distribution of these highland plants he had noticed many inconsistencies which are difficult to explain. *Sibbaldiopsis tridentata*, common in northern New England, and found on the summits of the Taconics, may be found on Mt. Beacon, opposite Newburgh, but does not occur in the Highlands west of the Hudson nor on Schunemunk Mountain, regions which are higher than Mt. Beacon. The frequent fires in the territory west of the Hudson may account for this. This plant occurs also at High Point in the Kittatinny Mountains, New Jersey, on sandstone, but is not found elsewhere in the Kittatinny Range, although it might be expected there. It occurs on high summits in Pennsylvania, Virginia, and West Virginia, and was found by the speaker on Mt. Pisgah, North Carolina.

Arenaria groenlandica, the Mountain Sandwort, occurs at Mt. Everett, Massachusetts, Mt. Mansfield, Vermont, and elsewhere in New England—also on the Shawangunk Mountains in New York, but is not reported in the Highlands of the Hudson.

The southern limit of the Red Spruce, (*Picea rubens*) for the immediate vicinity runs along the New York-New Jersey boundary from the Tappan Sea. Local names seem to indicate that it used to grow southward of this, e.g., "Spruce Run," in Morris County, N. J. In Orange County, N. Y., near Greenwood Lake, there are two or three stands about Cedar Pond, east of the Lake; also it occurs west of the Lake at an elevation of 1200–1400 ft. It is also found at High Point, but not a single one occurs at present in Hudson or Bergen counties, although they are included in the range given in Mr. Taylor's "Flora of the Vicinity of New York." It has now become extinct in these counties, perhaps as a result of suburban extension and the cutting off of timber.

Linnaea borealis occurs at Green Pond, Warren County, N. J.

Two colonies of *Clintonia borealis* are found in Harriman Park; one at Cohasset Lakes at an elevation of 1000–1100 ft. or over, and the other at the north end of Lake Sebago, five miles north of Sloatsburg. There is a station also at Green Pond, Warren County, N. J. *Streptopus roseus* occurs in Harriman Park in Surebridge Swamp east of Arden on Wawayanda Mountain, west of Greenwood Lake.

The Southern White Cedar (*Chamaecyparis thyoides*) occurs at Cedar Pond, east of Greenwood Lake, and in the Cedar Swamp west of Greenwood Lake; also at High Point in the Kittatinny Range. Why has this species, common in the coastal plain region, entered the territory exposed by the retreat of the glacier? Why has it climbed to an elevation of 1600 feet? The Northern White Cedar (*Thuya occidentalis*) is associated with it at Cedar Pond and at High Point. In the latter place the Red Spruce (as noted) and *Rhododendron maximum* and *Kalmia latifolia* are associated with it.

Panax quinquefolium, the Ginseng, is occasional in the highlands of the Hudson, as is also *Lycopodium lucidulum*. *L. annotinum* has Blackhead of the Catskills as its most southern record. The Cancer-root, *Conopholis americana*, is found at moderate elevations in Harriman Park. *Coptis trifolia* occurs in a few cold, wet woods in the Highlands of the Hudson, and on the plateau in northern Passaic County, New Jersey.

Viburnum alnifolium is found in the Highlands of the Hudson on high, wet ground, Surebridge Swamp and on Bearfort Mountain in northern New Jersey. *Claytonia caroliniana* has a station on top of Blackhead Mountain in the Catskills. *Trillium undulatum* occurs in Harriman Park and near Denmark Lake, Morris County, N. J. In the northern Catskills it is common at an elevation of 2500–3000 feet. *Cornus canadensis*, common in northern New England, is absent from a radius of 50 miles about New York City, except one station on Schunemunk Mountain, Orange County, at an elevation of 1600 feet.

Ledum groenlandicum, the Labrador Tea, occurs at Bingham Pond, in the Taconics, also in the Kittatinny Mountains. The Rhodora (*Rhodora canadense*) is found on Bearfort Mountain near Lake Surprise, and is also near High Point, N. J., but is wanting in the Highlands of the Hudson west of the river. The Bearberry, *Arctostaphylos uva-ursi*, common in the New Jersey Pine Barrens and at the east end of Long Island from Lake Ronkonkoma to Montauk Point, has been found in three places recently in the Hudson Highlands. It occurs on Black Mountain at an elevation of 1200 feet, Fingerboard Mountain at 1260, and near Greenwood Lake at 1400. Why should this climb the mountains when from its more southern distribution it seems to be a lowland plant?

A station for *Taxus canadensis* is located on Hook Mountain opposite Ossining, where it was found this year. Although, according to Taylor's Flora, it occurs in Bergen County, N. J., it has apparently disappeared from this locality. It also appears at Bearfort Mountain, N. J. The Arbutus, *Epigaea repens*, appearing on old wood roads is evidently increasing, perhaps due to the assistance of the Conservation law.

In the discussion which followed, Dr. Denslow remarked that the gaps in the apparent distribution of some of these species might be due in part to lack of information. Dr. Stout remarked upon the scarcity of fruit in *Epigaea repens*, a pod or capsule similar to that of the Bearberry. Dr. Britton stated that the Southern White Cedar evidently prefers sandy soils and believed that the soil of the high swamps where it grows would be found to be of such a nature. Dr. Gundersen remarked that several plants which are rare in the Highlands of the Hudson are common in the northern Catskills, e.g., *Streptopus roseus*, *Lycopodium lucidulum*, *Viburnum alnifolium*, *Claytonia caroliniana*, *Coptis trifolia*, *Vaccinium canadense*, *Taxus canadensis*, *Abies balsamea*, and *Cornus canadensis*. Among plants in the Catskills which are not in the Highlands, may be mentioned *Betula coerulea*, *Lycopodium annotinum*, *Amelanchier oligocarpa* and *Dryopteris spinulosa* var. *latifolia*.

ARTHUR H. GRAVES,
Secretary.

MEETING OF MAY 8, 1928

This meeting was held in the American Museum of Natural History.

By unanimous vote, Miss Jeanne E. Van Anstel, 339 East 25th Street, New York City, was elected to membership in the Club.

The Secretary read a communication from the Phi Sigma Society announcing an offer by this society of a prize of at least $50 for the most meritorious paper presented on the program of the Phi Sigma Society by a non-member at the New York meeting of the A. A. A. S., beginning December 27, 1928. The details of this offer were printed in the last number of Torreya.

The Secretary remarked that according to the old schedule

of meetings the next meeting would come on Decoration Day, May 30. According to the new schedule the next meeting should be held on the third Wednesday, i.e., May 16. Since it would be impossible to arrange a program for this meeting with due announcement in the Bulletin of the New York Academy of Sciences, he moved that this second meeting in May be omitted. This was so voted by the Club.

The scientific part of the program consisted of an illustrated lecture by Dr. Raymond H. Wallace of Columbia University, entitled, "The Development of Plant Tumors in Response to Ethylene Gas." A summary of this lecture follows:

A detailed histological and cytological study shows that the intumescences which develop in the buds and stems of Transparent apple in response to stimulation by ethylene gas arise through three fundamental changes in the tissues, namely: solution of walls, hypertrophy of cells, and proliferation of cells.

The walls are corroded away very irregularly by solution processes induced or accelerated by ethylene gas. Certain restricted portions of the secondary walls may be entirely corroded away before adjacent areas are appreciably modified. The middle lamella goes into solution just prior to or at the time of the complete solution of the secondary thickenings. The solution of the walls results ultimately in the more or less complete separation of the cells from tissue continuity and the rounding up of the individual protoplasts.

All living elements between the phellogen and the true cambium may undergo this corrosion of walls and the liberation of the cells from the tissue masses. Even the non-living elements such as the bast fibres and walls of the young xylem vessels are often digested away.

Very distinct corrosion zones, which apparently represent diffusion tracts for the ethylene or the ethylene stimulus, are usually present in young intumescences.

Great hypertrophy of cells usually accompanies the solution of the walls, but this enlargement of the cells is not necessarily the primary cause for the freeing of the cells from tissue continuity. The free cells in the outgrowths may vary from normal ones only 25 by 30 microns to giant ones as much as 50 by 360 microns.

The phellogen frequently exhibits a more striking hypertrophy than any other tissue of the stem.

The cells of any living tissue of the bark may divide during the formation of intumescences. Normal mitotic division figures occur throughout. An increase of about 35 percent in the number of cells was found to occur in outgrowths in the ends of cuttings.

Calcium oxalate crystals are usually very abundant among the free cells of an intumescence, and are apparently a by-product of the solution of the cell walls.

The thin-walled hypertrophied cells, which make up the major portion of the swollen mass of the intumescences, usually contain two or more large vacuoles. The cytoplasm between these vacuoles makes the cells appear to be divided by cross-walls. These cells may live for several weeks after becoming free.

A protective cork layer generally forms along the inner margin of an intumescence and separates it from the normal tissue below. This layer when present limits the spread of the swellings. When conditions are favorable for the development of the swellings the cork layer may fail to form.

ARTHUR H. GRAVES,
Secretary.

FIELD TRIPS

FLOWERS LATE THIS SPRING

Members of the Torrey Botanical Club, on field trips in May, in the Ramapo section of the Palisades Interstate Park, found the trees and flowers very late in putting forth leaves and blossoms this spring. *Cypripedium parviflorum*, which Mr. L. F. Logan expected to show his party on May 13, had not appeared above ground, and *C. acaule* which ordinarily is in bloom by May 5, was just emerging. This party was a large one, numbering twenty-two, the route being from Tuxedo, over the Tuxedo-Mount Ivy Trail to Lake Sebago, then down Stony Brook, and back to Tuxedo. Purple trillium was in prime, two weeks late, and Marsh Marigold was still in bloom. Four of this party, led by the chairman of the field committee, who branched off and followed the Suffern-Bear Mountain Trail to Suffern, had an exciting adventure. They ran into a

bad forest fire on the Ramapo Rampart, four miles northeast of Suffern, and had to leave the trail and make a rough detour, skirting the ground fire, which was burning fiercely uphill, defying the efforts of a small group of fire fighters to stop it. It was not stopped until the next day, when a large force of men from the Palisades Interstate Park joined the town forces and extinguished it on a two-mile front at Conklin Meadow, west of the Rampart. It burned over 1800 acres, and it was lamentable to see what damage such a blaze does to succulent spring flowers, like *Cypripedium acaule*, charring them to death for the season and probably permanently killing many individuals.

Members who joined the Adirondack Mountain Club for a week end at Camp Nawakwa, on Lake Sebago, in the Harriman Park, May 26–27, found the Pinxter Flower, *Rhododendrum nudiflorum*, in its prime, and observed that it appears to be increasing everywhere in the more remote portions of the preserve. An interesting plant associated with the Uvularias, which is overlooked in most popular manuals, but is common in colonies of considerable size, in the Ramapos and Highlands of the Hudson, was *Disporum lanuginosum*.

The following is a brief report of the field trip of the Torrey Club to Bay Terrace, Staten Island, April 29. There were fifteen in the party, of which eight were members of the Torrey Club. The trip started from the railroad station going westward through the woods and turning north through the outskirts of a cemetery. Here the American Bittern was seen in a swamp. Still proceeding northward, the party saw the Yellow Palm Warbler, and the Rusty Blackbird, the latter with whitish circles around his eyes, and white spots on the wings. Coming out on the Richmond Turnpike, the bus took the members directly to the ferry. The woody plants on the attached list were seen on the trip.

WOODY PLANTS SEEN NEAR BAY TERRACE

APRIL 29, 1928

Vaccinium corymbosum
" vacillans
Amelanchier canadensis (in bloom)
Corylus americana
Rhododendron nudiflorum
" viscosum
Smilax rotundifolia

Acer rubrum
Salix vitellina
" discolor
" humilis
Myrica carolinensis
Prunus avium
" serotina
Aronia arbutifolia
Hicoria ovata
" glabra
" alba
Betula lenta
" populifolia
Sassafras variifolium
Populus grandidentata
Quercus alba
" bicolor
" rubra
" velutina
" coccinea
" montana
" palustris
Castanea dentata
Juglans nigra
Liquidambar styraciflua
Clethra alnifolia
Nyssa sylvatica
Blackberry-Rubus sp.
Gaylussacia baccata
Rhus toxicodendron
" copallina
" glabra
" vernix
Fagus grandifolia
Benzoin aestivale
Leucothoe racemosa
Viburnum prunifolium
" dentatum
Psedera quinquefolia
Sambucus canadensis
Ulmus americana
Carpinus caroliniana
Liriodendron tulipifera
Robinia pseudoacacia
Kalmia angustifolia
Spiraea latifolia
Ailanthus glandulosa

NEWS NOTES

Dr. Forman T. McLean has resigned from the staff of the Experiment Station of Rhode Island State College to accept the position of Supervisor of Public Education at the New York Botanical Garden. Dr. McLean is a graduate of Yale University, 1907, taking also the degree of Master of Forestry there in 1908. He was in the United States Forestry Service from that date until 1913, when he went for special graduate studies to The Johns Hopkins University, from which he received the degree of Ph. D. in 1915. From 1915 to 1921, he taught botany in the University of the Philippines.

The Boyce Thompson Institute for Plant Research of Yonkers has begun an arboretum on a 300 acre tract on the side of Sprain Ridge. The ridge was well covered with second

rowth oak forest. This has been carefully gone over to remove ead or diseased trees and much of the underbrush. New trees ative to the region are being set out in the original forest. In the valley below a nursery has been started and all kinds of trees that will grow in this climate are to be planted. The arboretum will be for exhibition and demonstration as well as research on forest problems and will be open to the public.

Samuel B. Parish, honorary curator of the herbarium of the University of California and lecturer in Stanford University, died on June 5, aged 90 years.

Dr. Charles F. Hottes, professor of plant physiology at the University of Illinois, has been appointed professor of botany and head of the department to succeed Dr. H. L. Shantz, who becomes president of the University of Arizona.

The new Rose Garden of the Brooklyn Botanic Garden was opened to the public on Sunday afternoon, June 24th. It will be open hereafter every afternoon except Sundays and holidays. In the garden the older horticultural varieties are planted at the north end, the latest introductions at the south. Around the border are different species of *Rosa*.

Prof. R. Ruggles Gates, of the University of London, accompanied by Mr. K. Mellanby of Cambridge sailed on June 23 for Canada to make a botanical and anthropological expodition down the Mackenzie River. Facilities for the expedition are being furnished by the Hudson's Bay Company.

Dr. Edmund W. Sinnott, Professor of Botany and Genetics at the Connecticut Agricultural College has been appointed head of the botanical department of Barnard College, Columbia University, to succeed the late Dr. Herbert Maude Richards.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor, G. T. Hastings, 2587 Sedgwick Ave., New York when returning proof.

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150 "	2.97	5.06	7.15	8.36	11.22	13.31	15.62	16.72	23.48	29.48
200 "	3.85	5.55	7.86	9.18	12.44	14.85	17.38	18.53	25.90	32.56
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Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796–1873

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GEORGE T. HASTINGS
2587 Sedgwick Ave.
NEW York City

TORREYA

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The Distribution of Silene Wherryi Small

Edgar T. Wherry

Two years ago Dr. John K. Small[1] described and named in my honor a new species of *Silene* which had been observed on limestone rocks in Kentucky, and which was represented in herbaria also from Albertville, Alabama. In a private communication Dr. Roland M. Harper subsequently called my attention to the fact that the rock at the latter place is sandstone rather than limestone, and suggested the desirability of further study of the habitat of the plant. In the Spring of 1928 such study proved possible. Accompanied by Mr. J. E. Benedict, Jr., of Washington, D. C., I drove across Alabama, visiting promising localities, and finding several new stations for it. A detailed account of its field relations can accordingly now be put on record.

Although in previous years confused with *S. caroliniana* Walter, the new species can be readily differentiated from that, even upon superficial examination in the field. The plants of *S. Wherryi* average rather larger; the petals are less notched at the tip, and their crown is less conspicuous; the calyx is densely covered with lustrous hairs which are quite free from glands, while in *S. caroliniana* the hairs are fewer but largely gland-tipped, so that minute insects and dust-particles are often found adhering to them. The two species are apparently quite distinct in geographic range.

While the flower-color at the Kentucky stations, where the plant first attracted my attention, was bright rose (around Ridgway's No. 71b), all of the Alabama colonies seen showed paler colors, ranging from No. 71f to white; the original description should accordingly be amended to include this color range, especially in that the type locality, Albertville, yields par-

[1] Torreya, **26**:65. 1926.

ticularly pale forms. The details of its distribution, by states and counties, in alphabetical order, follow.

Alabama

Autauga County.—In this Coastal Plain county *Silene Wherryi* was first discovered by Dr. Roland M. Harper on April 22, 1928, in moderately rich woods about 2 miles southwest of Booth. On April 28 Mr. Benedict and I found it sparingly in open oak woods on gravelly soil 4 miles southeast of Marbury, near the northeastern corner of the county, the soil reaction proving to be subacid.

Bibb Co.—A large colony of the plant was observed on April 25 on wooded slopes 4 miles north of Centerville. This locality is in the Appalachian Valley physiographic province close to the Fall Line, and the rock is sandstone, the soil being minimacid.

Cullman Co.—The specimen from Cullman cited by Mohr[2] under the name *Silene caroliniana* is now in the National Herbarium, and proves to represent the new species. We were unable to locate any *Silene* in that region.

Elmore Co.—On thinly wooded sand-hills just below the Fall Line about 8 miles east of Wetumpka this *Silene* was found in abundance on April 27, the soil reaction proving to be subacid. It is associated with a dwarf *Phlox*, which had been discovered there by Dr. Harper in July, 1927, and which was found, on examination of the few flowers remaining in late April, to represent the species listed in Small's Flora of the Southeastern United States as *P. Hentzii* Nuttall, not definitely known elsewhere in the State.

Etowah Co.—In the National Herbarium there is a specimen from Gadsden, although we did not find any there on this trip.

Jefferson Co.—The steep sandstone ridges around Birmingham support extensive colonies of this *Silene*, and we collected it on April 28 on the southeast side of Shades Mountain about 5 miles south of the city. The reaction was again subacid. Dr. Harper also reports observing it from the train between Monmouth and Trafford in this county.

Marshall Co.—In describing *Silene Wherryi* as a new species, Dr. Small designated as type the best preserved specimen in the

[2] Plant life of Alabama, 497. 1901.

New York Botanical Garden herbarium, which had been collected by J. B. Hobdy of an "Alabama Biological Survey" party at Albertville in this county April 22, 1899. A visit there on April 30, 1928, disclosed that while the region is now largely under cultivation, colonies of the plant still persist on the banks of Drum Creek, 2½ miles northwest of the town. It grows in minimacid soil on ledges of a somewhat calcareous sandstone, exposed where the stream has cut down into the surface of the Sand Mountain plateau.

Kentucky

Franklin Co.—The Gray Herbarium possesses a specimen labeled "Frankfort. May" but without other data, and also another, collected by Griswold, but lacking definite locality and date.

Garrard, Jessamine, and Mercer Counties.—Near the Kentucky river, in these counties, *Silene Wherryi* grows on wooded ravine-slopes, and locally on limestone ledges. Deep-colored flowers are here the rule, and the soil reaction is neutral or essentially so.

Missouri

Phelps Co.—A specimen of *Silene* in the herbarium of the New York Botanical Garden, collected by J. H. Kellogg at Jerome, in this county in the Ozarks, April 28, 1914, proves to represent the new species.

Pulaski Co.—On April 14, 1928, Mr. J. E. Benedict Jr. found the same species 10 miles northeast of Waynesville. Its color is deep pink, and the soil reaction is minimacid.

North Carolina

Macon Co.—A specimen collected by T. G. Harbison at Highlands, in May 1912, preserved in the Gray Herbarium, shows the characters of *S. Wherryi.*

Tennessee

The only *Silene* seen from this state is typical *S. caroliniana*, kindly sent to me by Professor H. M. Jennison from Elizabethton, in Carter County, far over to the east. Search through the central part of the state, however, would no doubt disclose

the presence there of the new species, connecting the colonies in adjoining states.

Specimens representing the new finds have been deposited in the U. S. National Herbarium. The distribution of *Silene Wherryi* can now be summarized as follows:

On thinly wooded rocky or gravelly slopes, in neutral to moderately acid soils, in the inner part of the Coastal Plain and in various other physiographic provinces, Alabama to central Missouri, northern Kentucky, and western North Carolina.

Washington, D. C.

Notes on the Distribution of Dionaea

Roland M. Harper

In the July number of the Journal of the Elisha Mitchell Scientific Society (43: 221–228, pl. 33) Dr. W. C. Coker discusses the distribution of *Dionaea muscipula* (Venus's fly-trap), and shows the known localities (in about 14 counties in North Carolina and two in South Carolina) on a map. He also mentions several unverified and presumably erroneous reports of its occurrence outside of its present known range. To the list of unverified stations should be added one much more remote than any mentioned by Dr. Coker.

Philip Henry Gosse, an English naturalist (father of Edmund Gosse, the poet), spent the greater part of the year 1839(?) teaching at Pleasant Hill, Alabama, which is in the eastern edge of Dallas County, and near the southern edge of the black belt, the most fertile region in the state. After returning to England he published a small illustrated volume of 318 pages, entitled "Letters from Alabama, (U. S.) chiefly relating to natural history" (London, 1859), containing observations on plants, animals and people that he saw, in the form of a diary. On page 192, under date of July 5, he mentions *Dionaea*, and describes it in such a way as to show that he did not mistake a *Drosera* or *Sarracenia* for it(as some of the writers quoted by Dr. Coker may have done).

The average reader would naturally infer from this that he found the plant growing in the neighborhood; but he gives no locality or habitat for it, and he may have seen it cultivated in England and described it from memory, or even copied a

description from some book. For its occurrence in the most fertile region of Alabama, and so far from all known stations, seems extremely improbable. I have been in that neighborhood several times, and have not seen even a *Sarracenia* within 35 miles of the place,[1] though it is barely possible that some *Drosera* could be found in a boggy spot on one of the gravelly hillsides which are seen in a few places in that part of the black belt.

Dr. Coker in his paper does not indicate the habitat of *Dionaea*, except in quotations from previous writers, or suggest any environmental factor which might be responsible for giving it (and several other plants) such a restricted range. Although I have been in nearly every county in which it is known to grow, I never happened to find it; but I understand that its habitat is savannas or wet pine-barrens, like several species of *Sarracenia*.

In 1907 (Torreya 7:43; Science II, 25:540; Bull. Torrey Club 34:365), after making my first visit to Wilmington the previous summer, I observed that *Dionaea* is one of about half a dozen species of plants found only within about 100 miles of the mouth of the Cape Fear River, and there is a still larger number of species, mostly pine-barren bog plants, which are more abundant in that neighborhood than at twice that distance, though most of them reappear in Georgia. I offered no reasonable explanation at the time, but about three years later (Bull. Torrey Bot. Club 37:415–418) I pointed out that the Cape Fear pine-barren region (mapped on pages 407 and 592 of the same volume) had less than one-thousandth of its area cultivated in cotton in 1880, and was characterized by having a larger proportion of its rainfall in summer than surrounding regions; which seems a sufficient explanation of the variety and abundance of bog plants there. (The Alabama locality mentioned above has a very different type of rainfall, with rather dry summers.)

An amendment to this observation can now be made by taking advantage of a later climatological discovery; namely, that the principal pine-barren regions not only have abundant rain in summer (which is true also of the upper Mississippi valley, which has much more fertile soil and very different vegetation), but (quite unlike the upper Mississippi valley)

[1] See Torreya **22**:57–60. 1922.

have more rain in late summer than in early summer.[2] Wilmington has about four inches more rain in August–September, than in April–June.

UNIVERSITY, ALA.

Talinum rugospermum

JOHN M. HOLZINGER

This plant was first described in the Asa Gray Bulletin of December 1899. An error in the description and in the drawings makes it desirable to describe it again and include the corrections.

Although in reach of the type station all these years, I had not had an opportunity of visiting it till July of the present year. It was collected on the sand dunes of Trempealeau Bay, Wis. on the farm of Richard Gillis. The recent collection showed this species to be perennial,—the first description gave it as annual. This error was due to the fact that the description was made from seedlings raised in my garden, which bloomed the first year.

Further, the printer made the seeds of the two species look alike, though the description stated the facts correctly: the seed of the Wisconsin species is rugose, that of *Talinum teretifolium* is smooth and shiny.

Two points were not adequately emphasized: the Wisconsin plant grows in sandy soil, and has no corm; the eastern plant grows on rock, and generally has a corm. Otherwise the two plants look very much alike.

Following is a corrected and more complete description of *Talinum rugospermum.*

Stem cylindrical, fleshy, perennial, one or more inches long, forming short branches on the older plants; leaves crowded near the top of the stem or branchlets, 1 to 2 inches long, terete, fleshy; infloresence on a peduncle, 4 to 6 inches long, slender, cymose, the bracts small, about 1/12 inch long, narrowly triangular, prolonged below the point of attachment into a semicircular lobe; sepals 2, early deciduous; flowers when open $\frac{1}{2}$ inch in diameter, light pink, petals ovate, opening but once,

[2] See Science II. **48**:208–211. Aug. 30, 1918. For a map showing the line of equilibrium between early and late summer rain, and the approximate proportion of evergreens in the forests of the United States, see Engineering & Mining Journal, **112**:693. Oct. 29, 1921. Also Literary Digest a few weeks later.

between 3:30 and 4 P.M. and closing at 6 P.M., shrivelling as they close; stamens 12–25, their filaments deeper pink than the petals, anthers bright yellow, short; style cleft $\frac{1}{3}$ of its length; the 3 valves of the capsule falling on ripening, scattering the rugose seeds. (The seed was not correctly figured in the Asa Gray Bulletin, Dec. 1899, p. 116: the seeds of *T. rugospermum* should have rugose lines, that of *T. teretifolium* should be smooth.)

It is in prime condition the last week in July.

To distinguish the two species the following comparison is given:

T. teretifolium has long anthers, short style lobes, black, shining seeds, flowers open once, from noon till 3 P.M.

T. rugospermum has short anthers, long style lobes, gray minutely rugose seeds, flowers open once, from 3:30 till 6 P.M. The two plants look much alike. The former occurs more to the East, the latter, further West.

WINONA, MINN.

Solidago petiolata Miller and some other golden-rods

KENNETH K. MACKENZIE

In his various works and different editions Philip Miller (1691–1771) had a very considerable number of golden-rods. For a long time he did not adopt the Linnaean binomial system, but in the concluding years of his life he issued two works, the eighth edition of his Gardeners Dictionary published in 1768, and the sixth edition of his Abridgement of the Gardeners Dictionary published in 1771, in which he published a number of binomial names for American species of *Solidago*. His descriptions are usually good. In fact compared with those in Aiton Hortus Kewensis they are wonderfully good. However, it is evident that he did not know the species, and was much perplexed by them. He himself wrote "It is very difficult to settle the specifick differences of those now growing in the English gardens, for of late years there has been a great number of these and also of Asters raised from seeds, which have been sent from North America, from whence most of the sorts here mentioned originally came. But as the seeds have been gathered by persons little acquainted with the science of botany, so they

have generally been sent mixed together, which, when sown, the plants have risen promiscuously. So that in order to ascertain the species, the seeds should be saved very carefully and distinctly sown, to see if the plants arising from each do retain their difference."

Miller Abridgement Gardeners Dictionary Solidago ed. 5 1763; ed. 6 1771.

As a result he seems to have named several of our common species several times, examples being the various names proposed by him for *Solidago altissima* L. and *Solidago sempervirens* L. and the instance hereinafter discussed. In dealing with his work it must also be remembered that he was primarily a horticulturist and not a botanist. Another source of trouble with him is that the species treated in the Abridgement of the Gardeners Dictionary are to a certain extent not found in the Gardeners Dictionary and vice versa. And another most exasperating source of trouble is that in the sixth edition of the Abridgement he copied the concluding remarks for his last seven species erroneously from the fifth edition, getting in the wrong concluding remarks for each one of these species. One therefore has to refer to the fifth edition of the Abridgement or to the eighth edition of the Gardeners Dictionary to find out what he really meant. Two of his names which here appeared (*Solidago linearia* and *Solidago obtusifolia*) are names which have been overlooked by botanists and which do not appear in Index Kewensis. The present paper is devoted to ascertaining their proper use, as also the proper use of *Solidago petiolata* Miller.

Solidago petiolata Miller

In the seventh edition of his Gardeners Dictionary published in 1759 Miller had the following golden-rod:

"31. *Solidago caule paniculato, racemis confertis, foliis inferioribus lineari lanceolatis petiolatis, caulinis sessilibus glabris.* Woundwort with a paniculated Stalk, clustered Spikes of Flowers, the lower Leaves linear, Spear-shaped on Foot Stalks, and those on the Stalks smooth, fitting close. . . . . The thirty-first sort grows naturally at *Philadelphia*; the lower Leaves are smooth, entire, narrow, and Spear-shaped; they are three Inches and a Half long, and Half an Inch broad, standing upon long Foot Stalks. The Stalks are round, smooth, and rise three

Feet high; they are garnished with very small smooth Leaves which are entire and fit close to the Stalks. The Flowers grow in a close Panicle at the Top of the Stalk; they are of a bright yellow colour, and appear in September."

It appeared as Species No. 24 in the Fifth edition of his Abridgement of the Gardeners Dictionary (1763) with essentially the same description. The above description was copied in the eighth edition of the Gardeners Dictionary (1768) and the species there No. 29 was named *Solidago petiolata*. It does not appear in the sixth edition of the Abridgement (1771). Gray avoided dealing with this name in the Synoptical Flora, altho he did deal with most of Miller's names.

In the British Museum there is a specimen labeled *Solidago petiolata* Miller. I have a photograph of this kindly sent me by Dr. Rendle. It is a specimen of *Solidago odora* Ait., and in no way agrees with Miller's description, any more than any other specimens of *Solidago odora* do. This specimen was gathered in the Chelsea Gardens in 1762. It is self-evidently to be disregarded.

Anyone familiar with the golden-rods in the general region of Philadelphia will at once see that Miller's description is an excellent one of *Solidago stricta* Ait. (Hort. Kew. 3:216 1789)[1] and that it applies to no other species. And this conclusion is strengthened when one recalls that Aiton's material of *Solidago stricta* came from Miller, who he said first cultivated it in 1758.

✓ *Solidago linearia* Miller

In the fifth edition of his Abridgement of the Gardeners Dictionary (1763), Miller had the following description of a golden-rod:

"26. *Solidago caule paniculato, pedunculis erectis, foliis linearibus glabris integerrimis sessilibus.* Golden-rod with a panicled stalk, erect foot stocks to the flowers and smooth,

[1] *Solidago stricta* Ait "19. S. caule erecto glabro, foliis caulinis lanceolatis integerrimis glabris margine scabris: radicalibus serratis, racemis paniculatis erectis, pedunculis glabris.

"Willow-leav'd Golden-rod.

"*Nat.* of North America

"*Cult.* 1758, by Mr. Philip Miller

"*Fl.* September."

Aiton Hort. Kew. 3:216. 1789.

narrow entire leaves. . . . . The twenty-sixth sort sends out smooth panicled stalks two feet high, garnished with linear, smooth, obtuse leaves, which are entire, and fit close the stalk. The flowers terminate the stalk in loose panicles, standing erect."

The above species did not appear in the 8th edition of the Gardeners Dictionary (1768), but in the sixth edition of the Abridgement (1771) we find this same description repeated except that the leaves are described as spear-shaped and rough instead of linear and smooth. This species was here described as species No. 24 (by error No. 25 in second part of his description) and was given the name *Solidago linearia*.

The above species did not appear in the fourth edition of his Abridgement published in 1754 (where he called the genus Virga Aurea), nor did it appear in the seventh edition of the Gardeners Dictionary published in 1759. No specimen could be found in the British Museum.

It seems to me that the species described is *Solidago stricta* Ait.

Solidago obtusifolia Miller

In the fifth edition of his Abridgement of the Gardeners Dictionary (1763) Miller had the following golden-rod:

"28. *Solidago caule paniculato, racemis sparsis, pedunculis erectis, foliis, inferioribus lanceolatis serratis caulinis obtusis integerrimis sessilibus.* Golden-rod with a panicled stalk, the spikes of flowers thinly disposed, the foot-stalks erect, the lower leaves spear-shaped and sawed, but those on the stalks obtuse, fitting close. . . . . The twenty-eighth sort has smooth, pale, green stalks, which rise four feet high, and are thinly garnished with oblong, entire, smooth, blunt-pointed leaves, fitting very close. The lower leaves are large, spear-shaped, oblique and sawed on their edges. The stalks are terminated by simple racemi, which are thinly disposed in a corymbus, but their foot-stalks are erect."

In the sixth edition of his Abridgement (1771) he copied word for word the first part of the above description as Species No. 26 giving to it the name *obtusifolia*. However, when it came to copying his concluding remarks he copied the wrong ones, as follows: "The twenty-sixth sort hath purplish stalks which rise three feet high, and are closely garnished with rough spear-shaped leaves, slightly sawed on their edges, end-

ing in acute points. The stalks are terminated by erect racemi of flowers, growing in clusters, of a bright yellow colour." This in the fifth edition form the concluding remarks of his Species No. 27 otherwise described as follows: "27. *Solidago caule paniculato, racemis erectis, floribus confertis foliis lanceolatis serratis scabris.* Golden-rod with a panicled stalk, erect spikes with flowers in clusters, and spear-shaped, rough, sawed leaves." This does not appear in his other works and was never given a binomial name. I think it was based on a specimen of his own *Solidago conferta* (*S. speciosa* Nutt.)

It seems to me that *Solidago obtusifolia* Miller also represents *Solidago stricta* Ait. No specimen of it could be found in the British Museum.

I am therefore taking up the very appropriate name *Solidago petiolata* Miller, and treating *Solidago linearia* Miller, *Solidago obtusifolia* Miller and *Solidago stricta* Ait. as synonyms.

New York.

Joseph Edward Kirkwood[1]

Dr. Joseph Edward Kirkwood, Professor of Botany in the University of Montana, died suddenly on August 16, 1928, in his 57th year, while engaged in research at the University Biological Station at Yellow Bay, Flathead Lake, Montana. After graduation from Pacific University, in Oregon in 1898, he studied at Princeton University, Columbia University, and The New York Botanical Garden, receiving the degree of A. M. from Princeton in 1902 and that of Ph. D. from Columbia in 1903. His doctorate thesis on "The Comparative Embryology of the Cucurbitaceae" was published in Volume 3 of the Bulletin of The New York Botanical Garden. Fom 1901 to 1907, he was, successively, instructor, assistant professor, and professor of botany in Syracuse University. From 1907 to 1909, Dr. Kirkwood was associated with the Continental-Mexican Rubber Company, in studying the availability of the guayule shrub as a source of rubber, spending one year at Torreon, Mexico, and the next at the Desert Laboratory of the Carnegie Institution at Tucson, Arizona. Since 1909, he had been connected with the botanical and forestry work of the University of Montana. His summers were devoted chiefly to

[1] Reprinted from the Journal of the New York Botanical Garden.

the study of the flora of Montana and Idaho, with special attention to ecological problems and to experimental forestry. Some of his more important published papers are "The Pollen-tube in some of the Cucurbitaceae," "Some Features of Pollen-formation in the Cucurbitaceae," "The Growing of Guayule in relation to Soil," "The Life History of Parthenium (Guayule)," "Some Mexican Fiber Plants," "The Conifers of the Northern Rockies," and "Forest Distribution in the Northern Rocky Mountains." His illustrated articles of a semi-popular nature include "Desert Scenes in Zacatecas" in the Popular Science Monthly (Vol. 75), "A Mexican Hacienda" in the National Geographic Magazine (May, 1914), "Botanical Exploration in the Rocky Mountains" in the Scientific Monthly (Vols. 24 and 25). In cooperation with Dr. W. J. Gies at The New York Botanical Garden, he published an elaborate paper entitled "Chemical Studies of the Cocoanut with some Notes on the changes during Germination." Professor Kirkwood left an unpublished work, which Professor Severy has recently (Science II, **68**:223.75, 1928) described as "monumental," on the trees and shrubs of the northern Rockies. It is understood that the University authorities hope soon to have this on the press.

Professor Kirkwood was active and influential in the development of research work in the University of Montana and served as chairman of several of the university committees. He was a leader also in organizing the Northwest Scientific Association. He was interested, too, in the science teaching of the secondary schools and did much to organize and coordinate the science programs of these schools. In 1925 he was chairman of the Inland Empire Teachers Association. At the time of his death, and for many years before, he was a member of the Torrey Botanical Club.

Professor Kirkwood was a man of imposing physique, commanding personality, and irreproachable character. His untimely passing is lamented by numerous friends.

MARSHALL A. HOWE.

Bequest of the Burgess Collection of Asters[1]

The will of Professor Edward S. Burgess, who died at Yonkers, New York, on February 23rd, 1928, admitted to probate

[1] Reprinted from the Journal of the New York Botanical Garden.

by the Surrogate of Westchester County on March 14th, contains the following provision:

> "Item 6. My herbarium of Aster specimens, so far as now stored in my residence, I give to the New York Botanical Gardens to supplement those which I have already given there."

The specimens were recieved from Mrs. Burgess on June 7th, and at a meeting of the Scientific Directors held June 9th the following minute was authorized:

The collection of herbarium specimens of North American Asters formed during many years of study by Professor Edward Sandford Burgess, bequeathed by him to The New York Botanical Garden, received from Mrs. Burgess in June 1928, is a noteworthy addition of the herbarium of the institution. It fully illustrates all the plants described by him in "Species and Variations of Biotian Asters, with Discussion of Variability in Asters," published in 1906 as the thirteenth volume of Memoirs of the Torrey Botanical Club, following his learned "History of Pre-Clusian Botany in its relation to Aster," published in volume ten of these Memoirs.

Professor Burgess had been an Annual Member of the Garden since 1906, and he served as a Scientific Director during 1912 and 1913, while President of the Torrey Botanical Club.

The specimens supplementing those already given by him will be deposited in the herbarium of the Garden.

An appreciative record of his life and work has been written by Dr.Howe for publication in Bulletin of the Torrey Botanical Club.

N. L. Britton.

TORREY BOTANICAL CLUB FIELD TRIPS

Walking Fern was observed by members of the Torrey Botanical Club, on summer field trips, in two localities of exceptional interest, where geological conditions evidently governed the occurrence of the species. On July 15, on a walk from Arden, N. Y., through the western part of the Harriman State Park, over the Arden-Surebridge Trail, and the Surebridge Mine Road, the party was led to a limestone boulder, of a formation found in the Wallkill Valley, twenty miles northwest, a glacial fragment transported to the region and

laid down by the melting of the ice among masses of the country rock of granite and gneiss. On this limestone boulder, about five feet long and three feet thick is a thriving colony of the Walking Fern, the only one known in the Harriman Park, or the Hudson Highlands, though perhaps similar limestone erratics not yet reported, in remote spots, might bear like colonies. The marvel is, how the spores of the fern brought from the Wallkill Valley, where it is common on the country limestone, took root upon this isolated boulder among the Highland Archaean formations.

On July 28, another stand of Walking Fern was seen, on Firey Brook, a stream which enters Pompton Lake, near Pompton, N. J., on its east side, a quarter of a mile above the outlet dam. The left fork of this brook has worn a pretty gorge with a wall fifty feet high on the south or cutting side of the stream, with Newark sandstone at the top and at the bottom a curious kind of conglomerate, with pebbles and cobbles of rounded or sub-angular limestone, of basalt similar to that in the Packanack Ridge, close by, and of the Newark sandstone, just above. This conglomerate has been described by Dr. H. B. Kummel, in his report on the Glacial Geology of New Jersey, but is probably much older than the Pleistocene. The source of the sandstone and of the basalt is obvious enough, as these formations are in place close by, the igneous rock being visible in the dam at the outlet of the lake, and making up the semi-circle of hills which surrounds the brook valley, while the sandstone is the prevailing formation in the Pompton Valley to the west and in Bergen County to the north, and there is an inlier of it in the lower courses of both branches of the brook, underlaid by the conglomerate.

But the source of the limestone is not so obvious. It is thought to be of the same formation as that quarried on the surface at Tomkins Cove, and also found on the east side of the Hudson on Verplanck's Point. Dr. Kummel thinks it existed in the form of ledges or cliffs along the front of the older, Archaean formation of the Ramapo mountains, and that most of it was carried down some thousands of feet by the great fault—the famous Logan Line—which bounds the Ramapo granites and gneisses and the Triassic sandstones and diabases or basalts in Rockland County, New York and Bergen and Passaic counties in New Jersey. But, before this faulting,

erosion in stream beds, entering either a shallow estuary or a broad, swampy valley, in which the Triassic red sandstone was laid down, carried stream gravel into pockets in which it was compressed into conglomerate beds, such as this in the gorge, of Firey Brook, including among the pebbles, the basalt and sandstone. These beds escaped the great downthrow of the Logan Line. Farther north along the Ramapo River and Mahwah Creek, in Rockland County, New York, are conglomerate beds with limestone and granite pebbles, and at Stony Point is a bed along the same fault line, with limestone pebbles only in a red sandstone matrix, the basalt and granite being absent. At the Firey Brook conglomerate bed, limestone makes up at least one third of the material in the formation and this limestone evidently was hospitable to the usually lime loving Walking Fern. Here again the wonder is how the spores of the fern found a home in this glen, far from their occurrence on limestone ledges northward. Walking Fern has not been reported on the other limestone conglomerate along the fault line to the Hudson.

The excursion on August 5, primarily for a visit to the American Museum of Natural History station for the Study of insects, near Southfields, N. Y., included an unexpected pleasure, a swim in the cool, spring fed waters of Spruce Pond, which was grateful on a day with the temperature approaching the nineties. The Brooklyn Boy Scouts have been given the use of this place, for a leanto camp group, by the Palisades Interstate Park Commission, and their leader, Archibald T. Shorey, an enthusiastic amateur botanist, welcomed the party with hospitality in the form of cold lemonade, and the use of a boat, in which the shores of the little bog-lined tarn were comfortably examined. This little pond, high up on Wildcat Mountain, is quite unsuspected from the busy Ramapo Valley motor highway. Its plant associations are very interesting. Its name is from a small, scattered stand of red spruce, one of the most southern at such an altitude. There is also considerable American larch or tamarack, likewise an extreme southern stand in the east. Around the boggy shores the Virginia chain fern is abundant, with *Cassandra*, *Andromeda polifolia*, *Drosera rotundifolia*, *Calla palustris*, Pitcher Plant and other bog loving species. Mr. Shorey reported *Pogonia ophiglossoides* and

Blepharioglottis psycodes and *lacera*, in the dense and watery depths of the tamarack swamp. The pond is covered with white water lilies, one of the most numerous colonies remaining in this region.

Mr. A. T. Beals reported to the chairman of the field committee, that on August 5 at Clinton, Conn., he found an extraordinarily large stand of *Blepharioglottis ciliaris*, the Yellow Fringed Orchis, with 2500 flowering stalks, in a space 200 by 50 feet on the edge of a salt marsh. Some racemes were seven inches long, with as many as 150 flowers.

RAYMOND H. TORREY.

NEWS NOTES

Dr. and Mrs. T. D. A. Cockerell have returned to the University of Colorado from their trip around the world. They spent considerable time in Russia and Siberia visiting scientists and collecting. After several stops in India and Australia, visits were made to New Caledonia, Fiji, Samoa and the Hawaiian Islands. While in Siberia Dr. Cockerell sent the notes on the flora of the country published in our November-December number of last year.

After a summer in studying and collecting grasses in Newfoundland and Labrador, Dr. A. S. Hitchcock has returned to Washington, where he is in charge of systematic agrostology in the Bureau of Plant Industry.

Professor F. A. Varrelman, of the Department of Biology of the American University, Washington, D. C., spent the summer in a study of dodders in the laboratories and herbarium of the New York Botanical Garden.

Dr. Roland M. Harper has completed the catalogue of the shrubs and trees of Alabama on which he has been working for several years. The catalogue makes a book of about 350 pages and is printed as a state report for free distribution throughout the state.

The report is illustrated with numerous maps of distribution and photographs of the trees and shrubs.

Mr. Wilhelm N. Suksdorf, of Bingen, Washington, was awarded the honorary degree of Master of Science in Botany at the spring commencement of the State College of Washing-

ton. It was the first honorary degree awarded by the college for eleven years. (Science)

The International Education Board of the Rockefeller Foundation has given $200,000 to the Paris National History Museum for a new building to house the botanical collections. (Science.)

At the International Entomological Congress at Ithaca this summer, Dr. R. S. Tillyard read a paper on "Biological Control of Noxious Weeds." The paper described the work he has been doing in the introduction of insect enemies of the prickly pear,—which, introduced accidentally from America, has become the worst weed of the country. Several insects have been found that give promise of doing much to control the spread of prickly pear.

An interesting condition developed in Austria in August when the only candidates for the presidency were Dr. Richard Wettstein, professor of systematic botany in the University of Vienna, and Dr. Clemens Pirquet, specialist in the diseases of children. Dr. Pirquet won the nomination and becomes president at the end of November.

The British Empire Vegetation Committee announces that it is desired that the authors of all books and papers dealing with the vegetation and ecology of the Empire send copies of their publications, or abstracts, for publication in a series of abstracts that will appear as supplements to the Journal of Ecology. Corrected proof sheets of articles, will be abstracted so as to appear shortly after the articles are printed. Papers should be sent to Dr. T. F. Chipp, Secretary of the British Empire Vegetation Committee, 199 Kew Road, Kew, England.

Norman Taylor is representing the Brooklyn Botanic Garden on the American-Brazilian Scientific Expedition to the Amazon which sailed for Rio Janeiro on October 27. Besides natural history and archaeology the expedition will study chicle for an American chewing gum corporation, and map one of the tributaries of the Amazon rising in the Matto Grosso.

The recent return of Dr. E. W. Brandes of the United States Department of Agriculture from an eight-months expedition into unexplored regions of the Island of New Guinea marks the successful close of the first chapter in the story of the depart-

ment's search for new varieties of sugar cane with which to revive the industry in Louisiana and other parts of the South.

Not only does it mark the close of the first chapter, but of the most thrilling chapter. Doctor Brandes' party, which included Dr. Jacob Jeswiet of Holland, C. E. Pemberton of Hawaii, and Richard Peck of Illinois as pilot, was the first scientific plant-collecting expedition to utilize an airplane as the principal means of transportation in an unexplored region. The seaplane, equipped with pontoons for landing on lakes and rivers, carried the party more than 10,000 miles over the jungle-covered areas of New Guinea in the course of which they discovered 14 lakes and two rivers never before mapped. Numerous visits to tribes of pigmies and head hunters who were to see white men for the first time gave the party some interesting adventures and resulted in one of the natives taking a flight with them to Port Moresby where efforts will be made to develop him into an interpreter for the local Government.

But now the party has dispersed and the seaplane returned to its owner; the second chapter begins in tedious work requiring time and patience to develop the new cane varieties into something of value to the sugar industry. Out of the ton of green material collected from the wilds, containing cuttings of 221 varieties of two different species, may come the "super cane" which will restore the sugar-cane industry to its former stage of prosperity by successfully resisting the mosaic and other diseases which brought about the depression.

THE TORREY BOTANICAL CLUB

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In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE —a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

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Columbia University,
New York.

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

CONTENTS

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THE TORREY BOTANICAL CLUB

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Meetings of the Club are held on the first Tuesday of each Month at the American Museum of Natural History, New York City, and the third Wednesday at the New York Botanical Garden.

Torreya is the Official Organ of the
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GEORGE T. HASTINGS
2587 Sedgwick Ave.
NEW York City

TORREYA

Vol. 29 No. 6

November-December, 1928

The Japanese Beetle

Popillia Japonica Newm.

This new and dangerous pest was introduced twelve years ago in the vicinity of Philadelphia and has spread rapidly throughout the eastern parts of Pennsylvania, all of New Jersey and southern New York, including the western half of Long Island and Connecticut and has been reported recently from the vicinity of Springfield, Massachusetts.

It breeds so rapidly and feeds on such a variety of plants that it is recognized as a dangerous enemy, so that a special commission has been appointed to study its habits, food and natural enemies and to establish a quarantine and inspection system in order to try to check its damage. It is admitted that it will be impossible to destroy them entirely or to keep them from spreading, but they may be controlled by spraying, trapping and by their natural enemies both native and introduced.

The beetle is about half an inch in length with a brilliant green head and body and bronze-colored striped wings with tufts of white hairs on the segments of the abdomen. It feeds in the daytime, preferably in warm sunny weather and nibbles the leaves usually on the upper side. They attack the willows and poplars, elms and lindens, and show a preference for the sassafras and horse-chestnut. They also prefer any species of Asiatic origin such as barberries, knot-weed, rose-of-sharon, cherries, peaches and plums. The fruit-bearing trees and vines are often completely stripped of leaves and fruit and ornamental plants such as roses, hollyhocks, dahlias, cannas etc. attract them by their showy flowers. Certain vegetables also, such as cabbages and corn and a few berries, raspberries and blackberries, attract them, so the quarantine demands the examination of all such shipments from infected areas.

In certain portions of Pennsylvania and New Jersey as many as sixty bushels have been caught in traps in one day. They are boiled and fed to the chickens or used as manure.

They have a disagreeable odor and a dark oil, which is unpleasant unless they are cooked. Spraying with arsenate of lead will help to check them or drive them away, and some of our common birds, such as the purple grackle or crow-black bird and the starling are their worst enemies, also the kingbird, catbird and brown thrasher and thrush will eat them. Toads also are valuable as they catch them before they can do any damage or lay any eggs. Moles and skunks also feed on the grubs.

60 bushels caught in one day in August in one orchard.

The eggs are laid in the ground during the mating or breeding season, which lasts from the middle of June until the middle of October, and the grubs, like those of the June beetle, feed on the roots of grasses and other plants, doing a great deal of damage to lawns and golf greens. Poisoning of the soil with carbon-disulfide is often done to prevent this.

All the students of the high schools in New York City and adjacent territory may help in this crusade if they will, by catching and killing the beetles. Search while the sun shines, preferably in the early afternoon, drop them into a cup of kerosene and give them to your friends as specimens, so as to teach others to recognize them.

The Japanese Beetle Laboratory at Moorestown, New Jersey has issued a card for distribution showing the beetle enlarged and colored, and circulars of information may be had on application to the Department of Agriculture of the State of New Jersey at Trenton which will supply copies on request.

ELIZABETH G. BRITTON.

NEW YORK BOTANICAL GARDEN.

Fig. 1. Trap for Japanese beetles used at Jenkintown, Pa.

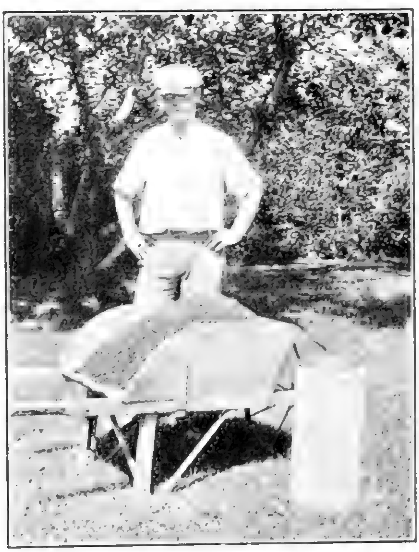

Fig. 2. A wheelbarrow full of beetles.

"Cuts by courtesy of the Florists Exchange and Horticultural Trade World."

FIELD TRIPS OF THE CLUB

The joint outing at the Pines in Branchville on May 18–20, led by Mr. and Mrs. William Gavin Taylor, was attended by sixty-five members and guests of the Torrey Botanical Club and eighteen members of the Sussex County Nature Club. The nature study leaders were Dr. Oliver P. Medsger, in charge of the bird census; Mr. A. Tennyson Beals, authority on mosses, and Mrs. George A. Anderson, who led in the collection and study of lichens. Dr. Will S. Monroe made a special trip from his farm in Vermont as the Honor Guest of the party.

The inn is situated in the largest group of indigenous white pines in New Jersey. Being rich in limestone, it has a large variety of spring flowers, including the yellow lady's slipper, *Cypripedium parviflorum;* the rock clematis, *Clematis verticillaris;* and the green orchis, *Coeloglossum bracteatum.* The limestone ferns are abundant, including walking leaf, maidenhair spleenwort, wall rue, purple cliff brake and fragile bladder fern. Seventy-six species of birds were identified, including twenty-one species of warblers. The damp weather was especially favorable for lichens, and a large number was collected and exhibited.

Mr. Beals says of the mosses:

Pine Hill is located on an outcrop of limestone and many of the mosses of this region are quite naturally those that thrive on a limestone habitat. The most conspicuous masses of moss are the Anomodons, golden green or yellow green in color. There are three species of this moss about the place—*Anomodon rostratus* (Hedw.) Schimp. found on the base of trees as well as on rocks; *Anomodon attenuatus* (Schreb.) Hueben, has branches that become thread-like toward the ends; and *Anomodon viticulosus* (L.) Hook. & Taylor, a coarse, stringy moss on rocks. All three species are found on the ledges in front of and below the house. Also on these ledges there are two patches of *Forsstroemia trichomitris* (Hedw.) Lindb. in good fruiting condition. This plant is more commonly seen on the bark of living trees in damp forests.

Under the trees in the grounds between the house and the lake is found *Catharinea undulata* (L.) W. & M. with long erect capsules, *Pohlia nutans* (Schreb.) Lindb., and *Amblystegium Kochii* B. & S., small plants with long curved capsules completely covering the small damp stones over which it is growing.

On the hill in the dryer areas there is a feather shaped moss that has red stems, and bright yellow green leaves with rounded tips, *Calliergon Schreberi* (Willd.) Bry. Eur. On the spots where there had been small camp fires there were two mosses: *Funaria hygrometrica* (L.) Sibth. and *Ceratodon purpureus* (L.) Brid. A turgid branched moss that has leaves with twisted apex, *Cirriphyllum Boscii* (Schwaegr.) Grout, was found. A dark green moss that stands up like tiny evergreen tress is *Climacium Americanum* Brid. *Rhodobryum roseum* (Weis.) Limpr. is a moss that produces rosettes of dark green leaves half an inch in diameter at the top of an erect stem one inch high and on one rock near the path many of these rosettes showed two to four large curved capsules on rather long stalks. Fern mosses are in evidence trailing on damp stomes,—*Thuidium delicatulum* (L.) Mitt. The apple moss, *Bartramia pomiformis* (L.) Hedw., a pale green plant with tiny globe shaped capsules, was frequently seen. *Aulacomnium heterostichum* (Hedw.) B. & S. appeared often among the rocks on the hillside.

On soil near the recreation hall where there had formerly been a garden there were several small patches of *Physcomitrium turbinatum* (Mx.) Brid. half an inch high with erect urn shaped capsules and in one of these patches several plants of a micro-moss were detected—*Ephemerumspinulosum* Schimper—one thirty-second of an inch high from the surface of the soil to the apex of the capsule.

In cracks along the ledges of the lake there are rows of rosette-like clusters of small fleshy green leaves, much smaller than *Rhodobryum* mentioned above. This is a moss typical of limestone and it does not fruit in this region altho a relative is frequently found with capsules. The moss in these cracks is *Encalypta streptocarpa* (Hedw.), Extinguisher Moss, so named because the outer covering of the capsule has the shape of the metal extinguisher of the tallow "dip" of colonial days.

Around the base of some of the white oaks in damp places in the nearby woods there is a gray green collar of moss that has short erect capsules having a white fuzzy top—*Thelia hirtella* (Hedw.) Sulliv.

In the pasture along the road north of the lake there were large patches of a dark green moss that bears short four angled capsules, *Polytrichum juniperinum* Willd., the Juniper Hair Cap.

This list could be extended by the addition of at least thirty more species, but the attempt has been made to name only the most conspicuous or most unusual species observed near "The Pines."

Archibald T. Shorey of Brooklyn, one of the leaders of the Boy Scout open lean to camp at Spruce Pond, in the western part of the Harriman State Park, near Southfields, N. Y., who entertained members of the Torrey Botanical Club one hot Sunday last August, by inviting them into the water where they botanized luxuriously *au naturel* all afternoon among the catfish and water lilies and fresh water sponges, has sent the chairman of the field committee a list of twenty ferns which the Scouts have found during the past summer about the locality.

Spruce Pond is a botanical paradise something like Cedar Ponds east of Greenwood Lake, with a Glacial Period relict flora of red spruce, tamarack and *Andromeda polifolia*, and perhaps other northern plants. It lies in a shelf basin on Wild Cat Mountain, 1000 feet above sea level and has been little disturbed by man.

"Ferns," remarks Mr. Shorey, "are interesting to collect because the varieties are limited and an almost complete collection can be made. They are easily preserved; there is slight danger of extermination; they are things of delicate beauty and their life history is fascinating."

"Over 20 varieties of ferns can easily be found about Spruce Pond. The following check list may prove of interest to nature lovers who may visit this unique spot:"

Cinnamon Fern, *Osmunda cinnamomea*, in swampy sections.
Interrupted Fern, *Osmunda Claytoniana*, on edge of swamp.
Royal Fern, *Osmunda regalis*, border of pond.
Sensitive Fern, *Onoclea sensibilis*, edge of swamp.
Polypody, *Polypodium vulgare*, everywhere in dry rocky places.
Christmas Fern, *Polystichum acrostichoides*, as above.
Broad Beech Fern, *Dryopteris hexagonoptera*, foot of cliffs, north side of pond.
Bracken or Brake Fern, *Pteridium aquilinum*, everywhere in dry places.
Maidenhair Fern, *Adiantum pedatum*, low ground northwest side of pond.
Chain Fern, *Woodwardia Virginica*, around edges of pond in water one to two feet deep, the best stand of this species in the Harriman Park.
Marginal Shield Fern, *Dryopteris marginalis*, in dry woods.
Spinulose Shield Fern, *Dryopteris spinulosa*, in dry woods.

Blunt Lobed Woodsia, *Woodsia obtusa*, top of cliff overlooking Greenwood Lake road.
Rusty Woodsia, *Woodsia ilvensis*, on cliffs back of pond.
Hay-scented or Boulder Fern, *Dennstaedtia punctilobula*, along trail from Southfields.
Ebony Spleenwort, *Asplenium platyneuron*, on low ground north side of pond.
Rattlesnake Fern, *Botrychium virginianum*, low ground north side of pond.
New York Fern, *Dryopteris noveboracensis*, everywhere.
Silvery Spleenwort, *Athyrium thelypteroides*, swampy sections around pond.
Marsh Fern, *Dryopteris thelypteris*, edge of pond and in swamp; fertile fronds abundant, which is unusual.

Mr. Shorey expects that further search will reveal other Grape Ferns, (Botrychium), and on some hidden cliff the Cliff Brake also probably the Oak Fern and Maidenhair Spleenwort. He reports a peculiar variety of Beech Fern, unlike anything listed in the Fern books. He hopes to find Walking Fern (which he might on a limestone glacial boulder, such as the one on Cohasset Lake), and the Adder's Tongue, (Ophioglossum, which would be likely, as it occurs at Twin Lakes, a few miles east). He remarks, truly, that this an unusual list for such a small area.

Thirteen members and guests comprised the party that visited Great Kills, Staten Island, Sunday, August 26. The main objectives of the trip were the Swamp Rose Mallows, *Hibiscus Moscheutos* L. and *H. oculiroseus* Britton, and on this account the way led east from the railroad station to the eastern shore of the island. There these two beautiful species of *Hibiscus* were found in abundance and perfect blossom in the salt marshes—also a form which is possibly a hybrid of the two, pink with a crimson center. The typical *H. oculiroseus* is white with a crimson center, while *H. Moscheutos* is pink without the crimson center. Other interesting plants seen were *Phragmites communis Trin.*, *Cassia nictitans L.*, *Lactuca scariola L.* and the variety *integrata*; and the tall *L. spicata* (Lam.) Hitchc. with blue flowers, growing as high as 8 feet, *Apocynum cannabinum L.*, the Indian Hemp, and several Polygonums — *sagittatum L.*, *Hydropiper L.*, as well as the common *pennsylvanicum L.* A hard and prolonged thunder shower cut the trip short in the afternoon, and materially dampened the enthusiasm as well as the raiment of the party.

On October sixth the Torrey Botanical Club visited the new arboretum and forest preserve of the Boyce Thompson Insti-

tute. Twenty members of the club were in the party. About as many more boys and girls, members of the science club of Theodore Roosevelt High School, joined the party. The woods were fine with the sumachs and dogwoods in brilliant reds and a few red maples glowing in swampy spots. Some of the dogwood trees were bearing very large numbers of bright red fruits. Several species of asters and of goldenrods were found, two species of Oxalis, *stricta* and *repens* were in bloom, Collinsonia was still in blossom in the thick woods. Several flowers that normally blossom in early spring or summer were found, one flower of the common blue violet, *Viola cucullata*, the rue anemone, *Anemonella thalictroides*, and the Indian pipe, *Monotropa uniflora*. On the edge of the Saw Mill River the party stopped to examine a patch of Lizard's Tail, *Saururus cernuus*. Only one fruiting spike was found though there were a large number of plants. The party examined the nursery of the arboretum where a large number of seedling trees and shrubs are growing. A few of the shrubs were in blossom, *Buddleia himalayana* was especially fine. The growth in the nursery has been very good this past season.

PROCEEDINGS OF THE CLUB

Meeting of October 2, 1928

This meeting was held in Schermerhorn Hall, Columbia University, and was called to order by President Denslow at 8:30 P.M.

Since several botanists have recently joined the staffs of institutions in the New York City area, the regular meeting of the Club was combined with an informal reception to these newcomers. Guests of honor were: Dr. & Mrs. Edmund W. Sinnott, Barnard College, Columbia University; Dr. & Mrs. Bernard O. Dodge, and Dr. & Mrs. Forman T. McLean, New York Botanical Garden.

One hundred and twenty-five members and guests were present, the following institutions being represented:

Barnard College
Boyce Thompson Institute

Brooklyn Botanic Garden
College of Pharmacy, Columbia University
Department of Botany, Columbia University
Fordham University
Hunter College
New York Botanical Garden
New York University
Rutgers University
Station for Experimental Evolution, Cold Spring Harbor

Dr. Denslow opened the meeting with a few words of welcome to the botanists who have recently come into the Metropolitan area. The guests of honor were requested to rise, a formality which was carried out to the accompaniment of vigorous applause. Dr. Denslow spoke briefly on the pleasant quality of sociability which characterizes not only botanists, but those in general who are interested in natural sciences.

The first meeting of the fall season is customarily devoted to reports of experiences and the presentation of items of botanical interest connected with the past summer. Speaking along this line, Dr. Harper showed plants sent in by Dr. H. M. Hall of the Carnegie institution. Dr. Hall, by experimental work is seeking, particularly by the growing of different species from seed, to bring out the relationship of the various species, and thus to make clear the evolutionary lines of descent in a given genus.

Mr. Torrey gave a brief outline of some of the field trips of the season and remarked on the evident increase of the Trailing Arbutus as shown by the fact that it was found growing on old wood-roads. Dr. J. S. Karling spoke of his recent trip to British Honduras to study the methods of obtaining chicle gum from the Sapodilla tree (*Achras Sapota*). The gum is obtained by bleeding the trees and this, as well as its method of preparation and shipment, is very similar to that in vogue for rubber.

The meeting was then adjourned, and an informal reception in the laboratories followed, refreshments being served by the Department of Botany, Columbia University.

ARTHUR H. GRAVES
Secretary

MEETING OF OCTOBER 17, 1928

This meeting was held at the Museum Building of the New York Botanical Garden and was called to order by Vice-President Hazen at 3:30 P.M. Twenty-three members were present. The minutes of the meetings of April 25, May 8, and October 2 were read and approved. The following twenty-two candidates for membership were unanimously elected:

Prof. C. B. Atwell, Hotel Cecil, 545 Post St., San Francisco, Calif.
Miss Mary F. Barrett, 19 Elm St., Bloomfield, N. J.
Thomas S. Bates, 4047 Seton Ave., N. Y. City
Miss Emily P. Cohen, 420 West 144th St., N. Y. C.
Mr. Morris Cohen, 16th St. & Michel Ave., Flushing, New York
Dr. B. O. Dodge, N. Y. Botanical Garden, N. Y. C.
Mrs. B. O. Dodge, 3001 Valentine Ave., N. Y. C.
Dr. A. E. Hitchcock, Boyce-Thompson Inst., Yonkers N. Y.
Miss Jeanette M. Kalabza, 2070 Seventh Ave., Long Island City, N. Y.
Miss Helen M. King, 282 Pavonia Ave. Jersey City N. J.
Miss Katie C. Kirkpatrick, 506 Lowry St., Stillwater, Okla.
Miss Elva Lawton, Hunter College, Park Ave., & 68th St., N. Y. City
Dr. Clifford S. Leonard, c.o Burroughs, Wellcome & Co., Tuckahoe, N. Y.
Dr. J. P. H. Marker, 357 Ninth St., Bklyn., N. Y.
Dr. Forman T. McLean, N. Y. Botanical Garden, Bronx Park, N. Y. C.
James E. Mitchell, Mitchell Farm Nursery, Barre, Vermont.
Mr. F. J. Pokorny, Columbia College of Pharmacy, 115 W. 68th St., N. Y. C.
Miss Helen Saunders, 454 Seventh St., Bklyn, N. Y.
Prof. Orville Schultz, Oklahoma A. & M. College, Stillwater, Okla.
Prof. Edmund W. Sinnott, Barnard College, Columbia Univ., N. Y. C.
Miss Ora B. Smith, 12 Fairview Ave, Jersey City, N. Jersey
Dr. P. W. Zimmerman, Boyce-Thompson Inst., Yonkers, N. Y.

The secretary spoke of the death on August 16 of Prof. J. E. Kirkwood, who had been Professor of Botany in the University of Montana, Missoula, Montana since 1913. From 1910 to 1913, he was Professor of Botany and Forestry at the same institution.

By vote of the Club, Mrs. B. O. Dodge was unanimously elected bibliographer in place of Miss Laura A. Kolk, resigned. It was also voted that the next meeting, which would occur on Nov. 6, Election Day, be omitted.

Dr. Hazen suggested that some sign of recognition be given by the Club to visiting botanists at the time of the A. A. A. S. meetings this coming December—by a smoker, dinner, or in some other way. On the motion of Dr. Harper, it was voted that the matter be referred to a committee composed of the officers of the Club.

The scientific part of the program consisted of a paper by Miss Laura A. Kolk of Hunter College, entitled: "The Relation between Host and Pathogen in the Smuts." A summary of this lecture, prepared by Miss Kolk, follows:

The distribution of mycelium of *Ustilago avenae* was studied in oat seedlings inoculated by means of the dry spore dusting method. In seedlings five days old and older, the mycelium was found distributed throughout the tissues of the coleoptile and mesocotyl, and no clew could be gained as to its place of initial penetration into the seedling. In seedlings from one to four days old, mycelium was found in the coleoptile from its tip to the coleoptile node, in the space between the first leaf and the coleoptile, in the first leaf, in the tissues of the node, and in the mesocotyl up near the coleoptile node. No mycelium was found in the scutellum, the root node, or the lower portion of the mesocotyl.

In three day old seedlings, initial penetration into the epidermis of the coleoptile was observed with the characteristic "holes" in the cuticle at the point of penetration noted by Brefeld. In one case a chlamydospore outside the seedling was found still attached to its germ tube which had made its way into and across the epidermal cell.

From a cytological study of the mycelium in the tissue of mesocotyl and coleoptile, many hyphae of unusual appearance were found—empty portions of filaments, long drawn-out threads, and swollen hyphae very similar to the hyphae des-

cribed by the older authors as encased in cellulose sheaths. These phenomena are interpreted rather as degeneration of hyphae, than as indicating a host-parasite reaction, but it is hoped that a study of mycelium after it has reached the cells of the growing point will give further information on this point.

Arthur H. Graves
Secretary

ACT OF INCORPORATION OF THE TORREY BOTANICAL CLUB

An act to incorporate the New York Botanical Club. Passed April 21, 1871.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. T. F. Allen, C. F. Austin, William Bower, Isaac Buchanan, F. J. Bumstead, W. DeF. Day, John Darby, Herbert Denslow, D. C. Eaton, W. L. Fischer, W. H. Forman, Charles B. Gerard, O. R. Gross, J. H. Hall, James Hogg, James Hyatt, William H. Leggett, Peter V. LeRoy, James S. Merriam, William M. Tweed, Jr., O. W. Morris, O. H. Perry, F. A. Pollard, J. H. Redfield, M. Ruger, F. A. Rockwith, John Torrey, George Thurber, James W. Ward, Cornelius Corson and G. W. Wilbur, members of the New York Botanical Club, instituted in the city of New York, and such other persons as now are or may hereafter become members of the said club, shall be, and hereby are constituted a body politic and corporate, in fact and in name, by the name of "the New York Botanical Club," and by that name shall have perpetual succession, and be, in law, capable of sueing and being sued, defending and being defended, in all courts and places, and in manner of actions and cases whatsoever, and may have a common seal and change the same at their pleasure, and by that name be capable in law of purchasing, receiving, holding, leasing, conveying or otherwise disposing of any estate, real and personal, provided the real estate so held shall not exceed in value fifty thousand dollars in the whole, nor the income of the real and personal estate exceed ten thousand dollars a year.

§2. The said club shall from time to time, forever hereafter, have power to make, constitute, ordain and establish such by-laws and regulations as they shall judge proper for prescribing the officers of the said club, and their respective functions and the mode of discharging the same; for the election of those officers; for the admission of new members; for the government of the officers and members thereof; for collecting annual contributions toward the fund thereof; for regulating the times and places of meeting of the said club; for suspending or expelling such members as shall neglect or refuse to comply with the by-laws or regulations, and generally for the managing and directing the affairs and concerns of the said club; provided such by-laws and regulations be not repugnant to the constitution and laws of this State or of the United States.

§3. The present officers of the said club shall hold their respective offices until others shall be chosen in their places.

§4. This act is, and is hereby declared to be a public act, and the same shall be construed in all courts and places favorably and benignly for every beneficial purpose therein intended; and no misnomer of the said corporation in any deed, gift, grant, demise or other instrument of contract or conveyance, shall vitiate or defeat the same, provided the corporation shall be sufficiently described to ascertain the intention of the parties.

§5. This act shall take effect immediately.

[Laws of the State of New York, 94th Session, Chap. 665.]

An act to amend an act entitled "An act to incorporate the New York Botanical Club," passed April twenty-one, one thousand eight hundred and seventy-one. Passed April 29, 1872; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The name of the said New York Botanical Club is hereby changed and altered to that of the Torrey Botanical Club, and under such name it shall be and hereby is constituted a body politic, both in fact and in name, with all the privileges granted in the act of incorporation, which this act is intended to alter and amend, and also subject to all restrictions contained in the said act of incorporation.

§2. The names of William M. Tweed Jr. and Cornelius Corson, are hereby stricken out of the list of names of the persons constituting the incorporators of the said New York Botanical Club.

§3. This act shall take effect immediately.

[Laws of the State of New York, 95th Session, Chap. 435.]

CONSTITUTION AND BY-LAWS

Adopted March 25, 1873. Amended at various times and codified March and April, 1927

CONSTITUTION

Article I—Name

The name of this Society shall be THE TORREY BOTANICAL CLUB.

Article II—Objects

The objects of the Club shall be to collect and diffuse correct information on all topics relating to Botany, and to promote an interest in this science.

Article III—Officers

The officers of the Club shall consist of a President, a First Vice-President, a Second Vice-President, a Treasurer, a Secretary, an Editor, Associate Editors, and a Bibliographer. The President, the Vice-Presidents, the Treasurer, the Secretary, and the Editor shall constitute a Board of Trustees in whom the corporate rights of the Club shall be vested. The officers shall be elected annually by ballot, and shall hold their offices for one year, or until others are installed in their places. At such election the presiding officer shall appoint two persons to receive and count the votes given thereat.

If a vacancy occurs in any of the offices of the Club, it may be filled by special election at a regular meeting of the Club, due notice of such election having been given by the Secretary, and the person so elected to fill a vacancy shall hold his office until the next annual election, or until his successor is chosen.

Article IV—President

The President shall preside at all meetings of the Club, and exercise all the powers and authority usually pertaining to a presiding officer.

Article V—Vice-Presidents

In the absence of the President, one of the Vice-Presidents shall preside; in the absence of the President and both Vice-Presidents, a chairman shall be chosen *pro tempore.*

Article VI—Treasurer

The Treasurer shall collect and have charge of all funds and securities of the Club. Out of such funds he shall pay the ordinary current expenses of the Club, and such other sums as may from time to time be ordered. He shall report to the Finance Committee all members six months in arrears for dues. No payments exceeding $25 shall be made by the Treasurer, except as authorized by the Annual Budget or by vote of the Club, unless first approved by the Finance Committee. The Treasurer's books shall be audited at least once every year by an Auditing Committee appointed for that purpose. The Treasurer shall render a report of the finances of the Club at the Annual Meeting, or oftener if requested.

Article VII—Secretary

The Secretary shall have charge of the Charter, Seal, Constitution and By-Laws, and the Records of the Club. He shall give due notice of all meetings of the Club, and shall keep full and accurate records of its proceedings. He shall notify each member of his election and report to the Treasurer the name and residence of each active member elected. He shall conduct the correspondence of the Club, and prepare all letters to be written in its name, retaining copies of them.

Article VIII—Editors

The Editors shall edit and supervise all the publications of the Club, and exchange and distribute them at their discretion.

Article IX—Bibliographer

The duties of the Bibliographer shall be such as may be assigned by the Club from time to time.

Article X—Members

The Club shall consist of active (including sustaining), corresponding and honorary members. Active members shall be entitled to vote and shall be eligible to office. Corresponding members may hold seats at the meetings of the Club, and may make such suggestions for the promotion of its objects as they may think proper, but shall not be eligible to office or entitled to vote. Honorary members may be chosen from botanists who have distinguished themselves through valuable original investigations, and shall be limited in number to five at any one time.

Article XI—Election of Members

Candidates for membership shall be proposed at a regular meeting of the Club, and be voted for at the next ensuing regular meeting, if the nomination be approved by a member of the Membership Committee. But upon unanimous consent of the members present, the persons so approved, may be elected at the same meeting at which they are proposed. They shall be severally voted for by ballot, and three negative ballots shall exclude.

Article XII—Annual Dues

Each active member, upon his election and annually at the beginning of each fiscal year thereafter, shall pay to the Treasurer the sum of five dollars. The payment of these annual dues shall entitle each active member to receive all publications of the Club issued during the year.

Active members indicating their willingness to pay fifteen dollars a year shall be designated sustaining members.

Article XIII—Resignation of Members

A member may at any time resign from the Club, on giving notice to the Secretary and paying such sums as he may owe to the Club.

Article XIV—Delinquent Members

Any member who, after due notice, shall, for the space of six months, neglect to pay his annual dues, shall cease to enjoy his privileges of membership until they are paid.

Article XV—Expulsion of Members

The Club reserves to itself the right of expelling unworthy members.

Article XVI—Standing Committees

The standing committees created by the By-Laws shall be appointed by the President.

Article XVII—Fiscal Year

The fiscal year shall commence on the first day of January, and all annual dues shall be payable at that time.

Article XVIII—Annual Meeting

The first regular meeting in January shall be the Annual Meeting. Nine members shall constitute a quorum for the transaction of business.

Article XIX—Election of Delegates

Delegates and representatives on the Councils of the New York Academy of Sciences and the American Association for the Advancement of Science, and other organizations with which the Club is or shall become affiliated, shall be elected at the Annual Meeting in January, the numbers of such delegates and representatives to be elected, depending on the quota regulations of such organizations.

Article XX—Amendments

Amendments to this Constitution must be proposed in writing at a regular meeting of the Club, entered on the minutes, and referred to a committee, which shall report thereon at the next regular or special meeting; and, at the regular or special meeting next thereafter ensuing (special notice having been given by the Secretary) a vote by ballot shall take place on the proposed amendment; and, if the same be approved by two-thirds of the members present, it shall thereafter form a part of this Constitution.

BY-LAWS

1—Time of Elections

All the officers mentioned in the Constitution of this Club shall be elected at the Annual Meeting, and shall enter on the duties of their respective offices immediately after the close of that meeting.

2—Mode of Balloting

The officers shall be elected separately by ballot, except that, by a vote of two-thirds of the members present, they may be balloted for upon a single ticket.

3—Meetings

Unless otherwise determined by the Club, the regular meetings shall be held on the first Tuesday and the third Wednesday of each month from October to May, inclusive, except the third Wednesday of December, at such time and place as the Club may direct. Nine members shall constitute a quorum for the transaction of business. The President may call special meetings upon his own motion.

4—Order of Business

The following shall be the order of regular business at all meetings of the Club except at the Annual Meeting:

1. Reading the minutes of the last meeting
2. Nomination of new members
3. Resignations
4. Reports of committees
5. Deferred business
6. New business
7. Election of new members
8. Scientific program.

At the Annual Meeting the order of business shall be as follows:

1. Reading of the minutes of the last meeting
2. Nomination of new members
3. Resignations
4. Reports of officers
5. Reports of standing committees
6. Reports of other committees
7. Deferred business
8. New business
9. Election of new members
10. Election of officers.

5—Standing Committees

The Standing Committees shall be as follows:

1. Finance Committee
2. Budget Committee
3. Program Committee
4. Field Committee
5. Membership Committee
6. Local Flora Committee.

6—Finance Committee

The Finance Committee shall consist of at least two persons, whose duty it shall be to examine all bills against the Club requiring their approval under Article VI of the Constitution, and if said bills are approved, refer them to the Treasurer for payment. All debts contracted by any committee must be approved by such committee before being presented to the Treasurer or the Finance Committee. It shall be the duty of the Finance Committee to invest the funds of the Club, whenever there may be a balance in the Treasury of more than five hundred dollars not wanted for immediate disbursement. No transfer of any stock, bond, note, or other evidence of debt standing in the name of the Club, shall be made except by the Treasurer, having the written order of the Finance Committee for that purpose; and all transfers shall be countersigned by the President or a Vice-President.

7—Budget Committee

The Budget Committee shall consist of at least three persons whose duty it shall be to prepare an Annual Budget and submit it to the Club for its approval, at the second meeting in January or as soon thereafter as possible.

8—Program Committee

The Program Committee shall consist of at least two persons whose duty it shall be to arrange for the scientific programs of the meetings of the Club during the year. The Secretary shall be, *ex-officio*, a member of this Committee.

9—Field Committee

The Field Committee shall consist of at least two persons whose duty it shall be to fix the dates and places of the field trips, and to select leaders.

10—Membership Committee

The Membership Committee shall consist of at least two persons whose duty it shall be to consider the qualifications of candidates for membership. The approval of one member of this committee will be necessary before such candidates can be elected.

11—Local Flora Committee

The Local Flora Committee shall consist of two distinct sub-committees of at least three members each, one for Phanerogams and one for Cryptogams, whose duty it shall be to prepare complete and accurate lists of all the plants, native, naturalized and adventive, occurring within one hundred miles of New York City, and to have such lists published, with as much description and illustration as they shall deem best, and as the funds obtainable for the purpose shall warrant.

12—Donations and Bequests

All donations and bequests shall be appropriated to the object designated by the donor; and the amount and description of each donation, with the name of the donor, shall be registered in a book kept for that purpose, and in the minutes of the Club.

13—Amendments to the By-Laws

Amendments to the By-Laws shall be prepared in writing and referred to a committee, which shall report them at the next regular meeting, and such amendments may be voted on, at the same or any subsequent meeting.

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[1] This list is of the active members only; corresponding members are not included.

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A BI-MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

John Torrey, 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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TORREYA

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January-February, 1929

The Gladiolus and its Development from the Wild

Dr. Forman T. McLean

No other genus of cultivated plants has such diversity of forms in it as has the Gladiolus. To properly understand these and their influences on our modern hybrid forms we must first get a picture of the native habitats of these plants and of the natural range of the genus. Climatic influences profoundly influence both their forms and growth habits. The Gladiolus is found growing wild in Southern Europe, Asia Minor, throughout Africa, the Canary Islands, and Madagascar. The greatest number of different forms, however, is found in South Africa, so we may properly confine our observations to this region. The west coast of South Africa has winter rains and a summer drought, while the interior and east coast have scanty and infrequent summer rains and a dry winter; accordingly, the species of the western provinces are small slender winter growers, which complete their growth and flower in the early spring. Only the mountain forms are tall and robust. Of the nine subgroups into which the genus Gladiolus can be divided, six of these are most fully developed in this region of winter rains. These include (1) the slender ones, such as the fragrant Afrikanders—Gladiolus recurvus, G. tristis, G. grandis—and (2) the Cardinal-flowered Gladioli, which are found both in the mountains and in the dry interior; including G. cardinalis, G. Saundersii and the large and impressive blood red G. cruentus. The third group of this western region are the Blandus group which are pale-flowered and are heavier growers than most. There are also other subgenera, quite distinct from the general run of Gladiolus. These are Hebea, Sweiggera, and Homoglossum. None of these have entered into the composition of the modern hybrids and they are not commonly seen, so they may be passed over here.

In the region of summer rains in the eastern part of South Africa are found the tall robust species of Gladiolus which

have met with favor among gardeners and have given rise to the modern varieties, these belonging principally to three groups. The Dragon's Head group, so called because of the shape of the flowers, include Gladiolus dracocephalus, G. primulinus, and G. psittacinus. The other two important groups of this region may be termed the Small-Flowered forms. These have relatively small blossoms and conferred upon our modern sorts a tendency to long spikes with many blooms open at once. The opposite-flowered Glodiolus oppositiflorus of the group called the Blandi, the lavender G. Papilio, and the yellow G. purpureo-auratus of the Parviflorus group, were the principal ones used in hybridizing, but appear no longer to be obtainable in cultivation. Besides these South African groups which I have mentioned and which include about 200 species there are nearly a score of Eurasians species which are relatively hardy and of interest for outdoor bedding. They have small flowers and in general the colors are not attractive.

Of this complex assortment of species only about a dozen have been concerned in the development of our garden varieties. The first hybrids of importance were the so-called Gandavensis strain which originated about 1840. These were hybrids derived principally from the wild species, the Parrot Gladiolus, the Opposite-Flowered Gladiolus, and Gladiolus floribundus. These three belong, the first, to the Dragon's Head, and the last two to the Blandus group, thus showing that the widely different forms of Gladiolus are easily intercrossed. The resulting hybrids produce long spikes of bright-colored, medium-sized flowers and were deservedly popular for nearly half a century up until 1890. The first radical departure from these Gandavensis sorts were the Lemoine hybrids produced by crossing these earlier sorts with another species, a purple spotted Gladiolus. This latter was a pale yellow flower with velvety purple throat blotch, striking markings, slender habits, and winter hardiness. These Lemoine or Butterfly Gladiolus as they were called were particularly popular in France and several of their descendants such as Elizabeth Tabor, La Couronne, Dawn, Mrs. Frank Pendleton, and La Luna, are still very popular garden varieties. Early in the development of these, Victor

Lemoine also used another Gladiolus species, G. Papilio, the Butterfly Gladiolus species. This had a bluish color with dark throat and yielded purple, violet, and blue-tinted seedlings. Baron Jos. Hulot, introduced by Lemoine in 1886, is still one of the most popular of the blue-violet Gladiolus. At about the same time that Lemoine was developing the Butterfly strain, a German, Max Leichtlin, was experimenting in crossing Gladiolus Saundersii with the old Gandavensis hybrids. His seedlings, because their stalks were short and had a few open blooms, were unpopular in Europe and finally his whole stock was purchased by an American nurseryman, and from this was developed the Childsii strain which was introduced in 1893. These had flowers of huge size and brilliant coloring. The varieties America, Panama, Niagara, Prince of India, and Columbia are still being grown among these old varieties. At about this same time Lemoine also made crosses between his Lemoinei varieties and the same Gladiolus Saundersii. His seedlings were almost identical in character with the Childsii varieties. In recent times, since 1900, all of these different strains have been so intercrossed with one another that we can no longer distinguish one type from another among our modern sorts. New forms of Gladiolus are so easily grown from seed and seedling Gladiolus vary so much in character that it is an easy matter for any industrious grower to produce hundreds of thousands of new kinds every year. Each grower then picks from his diverse assemblage of seedlings a few dozens or scores that appeal to him as the most attractive. For instance, Mr. A. E. Kunderd of Goshen, Indiana, has favored particularly the varieties with ruffled or frilled petals and has accordingly emphasized this trait which was not uncommon among the older varieties. Saffrano, introduced by Souchet in the eighties, was distinctly ruffled. Kunderd's first ruffled variety was Kunderdi Glory, introduced in 1907. He has since put out a number of very pretty ruffled sorts such as Marie Kunderd, Golden Frills, E. J. Shaylor, etc. The modern tendency in Gladiolus has been somewhat away from the stiff spikes with closely spaced flowers, which were the delight of the European gardeners of the past generation. Now an opener, more graceful spray effect, with flowers of only moderate size, seem to be preferred.

Gladiolus, Coronado, one of the modern varieties

Some of the most attractive slender sorts have been developed by crossing the garden hybrids with other wild species. The Maid of the Mist Gladiolus which was introduced from the moist gorge of the Victoria Falls in tropical Africa, has a rich yellow blossom which is small, narrow, drooping and very much hooded, it is slender and graceful of very distinctive form, its seedlings all are colored by a combination of the yellow of the species with the varied colors of the hybrid parent, giving delicate tints of orange, salmon, cream, and a variety or pastel shades. Ruffled blossoms have also been developed among these Primulinus hybrids and they are particularly graceful. Ming Toy, The Orchid, Butterfly, Golden Frills and Cara Mia all belong in this latter group. Recently the perennial demand for larger and larger sized flowers has resulted in the development of giant forms of Primulinus hybrids such as Giant Nymph. These retain the graceful habit of the wild species combined with larger size and firmer substance.

The modern Gladiolus thus has a complex heritage from a number of wild forms, but only four of the nine principal groups comprising the genus appear to have entered into the development of our garden varieties. The five remaining groups and the scores of neglected species offer ample opportunity for many new developments. It would be a rash person indeed who would attempt to predict what new developments there may be among Gladiolus even during the next decade.

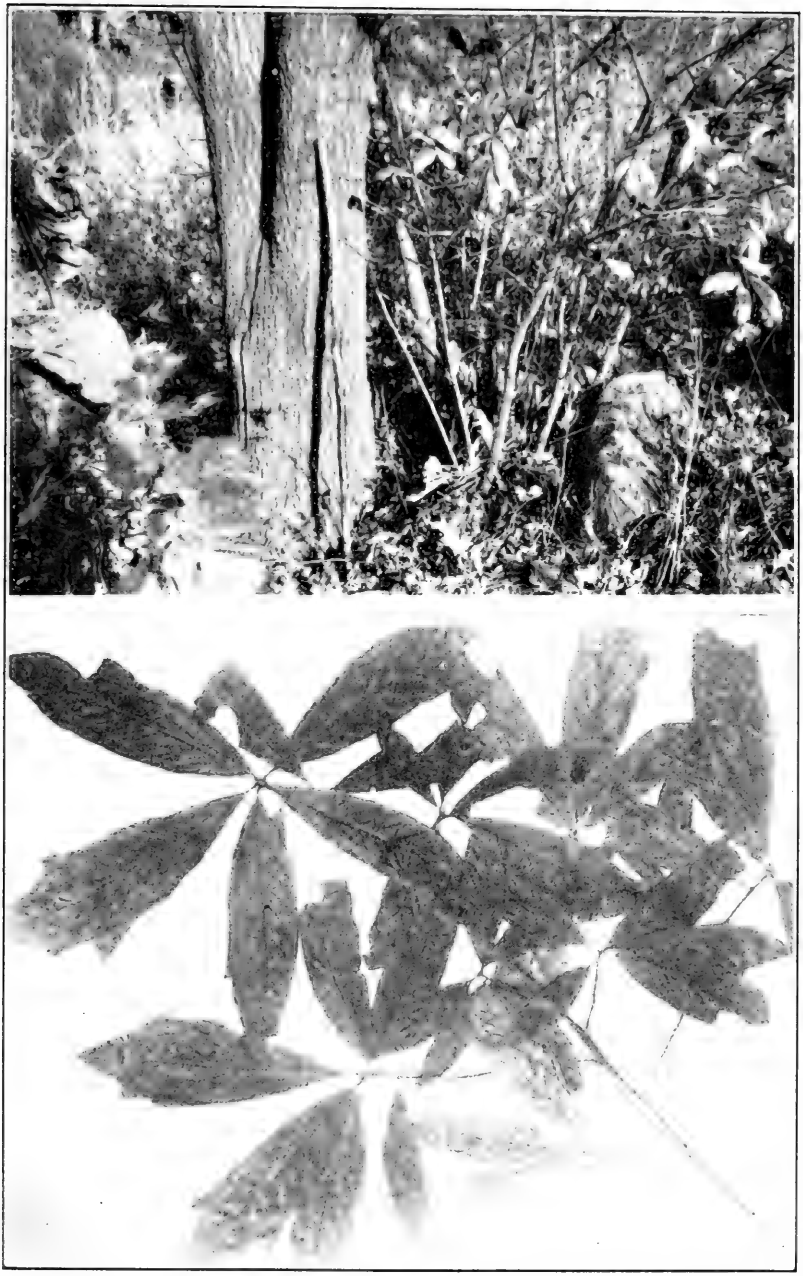
New York Botanical Garden

A Hybrid Oak at Westerleigh, Staten Island

Wm. T. Davis

While making observations on the seventeen-year Cicada on June 12, 1928, the writer was pleased to come upon an interesting hybrid oak on the northerly side of Chandler Ave. about one hundred feet from Jewett Ave. at Westerleigh, Staten Island. In laying out the first named avenue several years ago, the tree, which is close to what will be a side walk, was cut off about one foot above the ground leaving a low stump one foot four inches in circumference from which about a dozen shoots have since grown up, some of them to a height of about seven feet. One of the shoots is five and three quarters inches in circumference and seven feet two inches high. The foliage of this tree is remarkable and is that of the celebrated *Quercus heterophylla* Michx., which is supposed to be, and probably is, a hybrid between the red oak *Quercus rubra*, and the willow oak *Quercus phellos*. There are however, no known willow oaks anywhere near Westerleigh, nor are they to be expected in that part of the Island. The hybrid is evidently a native of the semi-wooded area where it stands today. Its trunk is within seven inches of that of a larger red oak with normal leaves and acorns; some of the latter, produced in 1927, I found on the ground. The leaves on the hybrid are thin and like those of a red oak, only much narrower, while many others are small and in shape like those of the willow oak.

This interesting tree will probably soon be completely destroyed by the widening of Chandler Ave., or the building of a house on the lot where it grows. How it got in its present position, so far removed from the willow oaks at the other end of the Island thirteen miles away, is a mystery. The nearest *Quercus heterophylla* is an introduced specimen growing in the Clove Valley on the westerly side of Britton's Upper pond, about one and a half miles away, on land now included in the city park area. This tree came from an acorn planted by the writer in October, 1888, and has now attained a considerable size, being four feet eight inches in circumference three feet from the ground. An account of it by Dr. Arthur



Hybrid Oak at Westerleigh, Staten Island, New York.

Hollick is given in the Pro. S. I. Assn. of Arts and Sciences.[1] Since 1917 it has been examined by several nature clubs in their visits to the Clove Valley, and it is probably the most noteworthy tree on Staten Island owned by the city of New York in its park lands.

The acorn from which the Clove Valley hybrid oak grew came from near Bedell Ave., close to the present Boulevard, and between Richmond Valley and the Billopp House. There are a number of hybrid oaks still standing at that locality that were discovered by the writer in 1888, and have since been visited by botanists on numerous occasions. They are described in the Proceedings of the Natural Science Association of Staten Island in September and October, 1888—and further noted in subsequent issues.

In the Proceedings of the Staten Island Institute of Arts and Sciences for October, 1918, there is an illustrated paper on "A Second Station for Hybrid Oaks on the Western End of Staten Island," wherein two additional trees of *Quercus heterophylla* are recorded as growing near the railroad station at Richmond Valley, but to the north of the tracks. At that time each of these trees was nearly four feet in circumference about three feet from the ground. I am pleased to state that they are still standing.

The discovery of hybrid oaks on the westerly end of the Island where the willow oak has been one of the parents, is not nearly as remarkable as the finding of a tree like the one at Westerleigh so far removed from any known tree of that species. How it came to be there cannot at present be explained.

[1] Vol. VII, pp. 32–44, October, 1917, with photographs of the tree.

Who Was Petri?

Ralph C. Benedict

For presenting the subject of bacteria to high school classes in hygiene and biology, the most indispensable piece of apparatus is the Petri dish. But,—who was Petri? And when and why did he invent the dish which goes by his name?

Probably many a teacher, in introducing his pupils to the experimental study of germs, has made some casual reference to the inventor of the ubiquitous double glass dish, and may have assumed, as I have, that the form of the name indicated an Italian origin. About a year ago I had occasion to inquire more particularly just when and why this supposed Italian invented his useful appliance.

First, I turned to the Encyclopaedia Brittanica, in full confidence that I should find there the neccessary details, but there was not a word. In surprise, I scanned the pages of other encyclopaedias at the Public Library at 42nd St., looking through editions brought out in America, England, Germany, Italy, France, and Norway, but without finding mention of any special dish. Petris there were common enough. A certain Olaus Petri, a Swedish theologist, received most space, but there were Germans of the same name, Dutch, Italian, Swiss, and in the English forms, Petries and Petrys. Finally, about tenth in the sequence of different encyclopaedias, I found in the Spanish "Encyclopaedia Universal Illustrada" a brief reference to R. J. Petri as a German bacteriologist, but with no reference to any particular apparatus perfected by him. For an exact reference to the original description of the "Petri" dish I am indebted to Dr. George M. Reed of the Brooklyn Botanic Garden. This first description of the apparatus is brief, and, considering its wide use, is well worth reprinting in translated form in full.

"A slight modification of Koch's plating method."[1]

"In order to make gelatin plates according to Koch's method, it is necessary as is well known, to use the horizontal, once-

[1] Petri, R. J. "Eine kleine Modification des Koch'schen Methoden Plattenverfahrens." Centralblatt for Bacteriologie (Abt. 1. Band) 1: 279, 280. 1887.

enclosed pouring apparatus. The finished plates are then placed in layers, one on top the other, on glass 'benches' under large bell jars. It is remarkable what can be accomplished in many cases with only limited facilities, especially without the pouring apparatus. Since the beginning of the school year, I have been using flat, double shells of about 10-11 cm. in diameter, 1-1.5 cm. high. The upper shell served as a cover and had a somewhat larger diameter. Into these dry-sterilized and and cooled shells I poured the liquid nutrient gelatin with its inoculated material. As the over lying shell is only slightly raised, and the gelatin is protected by the cover, it is not likely that there will be contamination: for example, the germs in the air could hardly enter. The spout is flamed in the usual way and cooled. The gelatin hardens very quickly when poured and forms a layer one millimeter in thickness, which is preserved for a considerable time, as it is protected by the upper cover shell.

"In experimenting with soil material, sand, dirt, and similar substances, it is an advantage to pour the material into the shell with liquid gelatin. One gradually acquires considerable skill in doing this. By using short, jerky motions of the shell, an even distribution of the material is obtained. If the foregoing instructions are followed every particle of the poured-out gelatin may be examined with an ordinary microscope. Only by excessive action will the layer along the rim become uneven. The gelatin dries very slowly in these shells. It may be kept moist longer by putting several shells (5-6) on top of each other in a larger shell on a layer of moist filter paper, covered with a bell jar—mouse jar, battery jar. Such flat shells are especially suitable for agar-agar plates, inasmuch as agar is hard to fasten on simple plates without special means. Moreover, the counting of grown colonies is simplified. After removing the upper cover, a glass plate, on which the usual division into square centimeters and their divisions, is placed underneath. The counting lens is set up, and the count is made on a black background. The surface area of the shell is then calculated from its diameter."

It does not appear from Dr. Petri's own account whether the double glass "shell" which is recommended was a new device or shape specially prepared according to his specifications.

Possibly he merely made use of a type already in existence, but this does not detract in any way from the value of the contribution which he so modestly entitles "Eine Kleine Modification." Actually it appears to have been one of those fortunate inventions or adaptations, which despite lack of any fundamental novelty, nonetheless have very greatly advanced the convenience of mankind.

By comparison with the earlier apparatus, it simplified bacteriological technique materially, obviating the need of using any longer the cumbersome apparatus with which Koch had made his transcendent discoveries. Fully to appreciate the advantages of Petri's "kleine Modification," it will be worth while to reproduce a brief description of the supplanted method, quoted from Muir & Ritchie, Manual of Bacteriology, pages 60 and 61, 1913.

GLASS PLATES (Koch).[1]

When plates of glass are to be used, an apparatus on which they may be kept level while the medium is solidifying is, as has been said, necessary. An apparatus devised by Koch is used (Figs. 17, 18). This consists of a circular plate of glass (with the upper surface ground, the lower polished), on which the plate used for pouring out the medium is placed. The latter is protected from the air during solidification by a bell-jar. The circular plate and bell-jar rest on the flat rim of a circular glass trough, which is filled quite full with a mixture of ice and water, to facilitate the lowering of the temperature of whatever is placed beneath the bell-jar. The glass trough rests on corks on the bottom of a large circular trough, which catches any water that may be spilled. This trough in turn rests on a wooden triangle with a foot at each corner, the height of which can be adjusted, and which thus constitutes the levelling apparatus. A spirit-level is placed where the plate is to go, and the level of the ground glass plate thus assured. There is also prepared a "damp chamber," in which the plates are to be stored after being made. This consists of a circular glass trough with a similar cover. It is sterilised by being washed outside and inside with perchloride of mercury 1–1000, and a circle of filter-paper moistened with the same is laid on its bottom. Glass benches on which the plates may be laid are similarly purified.

To separate organisms by this method, three tubes, a, b, c, are inoculated as in using Petri's capsules (p. 58). The hands having been washed in perchloride of mercury 1-1000 and dried, the plate box is opened, and a plate lifted by its opposite edges and transferred to the levelled ground glass (as in Figs. 17, 18). The bell-jar of the leveller being now lifted a little, the gelatin in tube *a* is poured out on the surface of the sterile plate, and while

[1] Muir & Ritchie—Man, of Bacteriology. Macmillan 1913, page 60, 61.

still fluid, is spread by stroking with the rim of the tube. After the medium solidifies, the plate is transferred to the moist chamber as rapidly as possible, so as to avoid atmospheric contamination. In doing this, it is advisable to have an assistant to raise the glass covers. Tubes *b* and *c* are similarly treated, and the resulting plates stacked in series on the top of *a*. The chamber is labelled and set aside for a few days till the colonies appear on the gelatin plates. The further procedure is of the same nature as with Petri's capsules.

In this very reference may be found a basis for evaluating definitely Petri's contribution. Just as the self-starter has multiplied the use of the automobile many times, so the Petri dish has very greatly increased the *convenience* of the experimental study of bacteria. From the standpoint of fundamental technical importance, Koch's earlier introduction of solid media was of much greater importance than Petri's innovation. To the latter, however, credit may be given for simplifying the technique, for eliminating time-consuming operations, for reducing the chances of infection, and for saving a vast amount of space. After a consideration of the involved processes used by Koch, it is scarcely to be questioned that, for the experimental demonstration of simple bacteriology in high school classes, the Petri dish is an indispensable tool.

Petri's life-span extended from 1852 to 1922. His work was mainly done while serving as a physician in a Berlin hospital. Reference to a complete bibliography shows that the paper describing the "Petri dish" was only one of a number dealing with the general field of bacteriology.

Haaren High School and Brooklyn Botanic Garden

A New Station for Nymphaea tuberosa Paine in Southern New Jersey

J. W. Adams

On June 19, 1926, the writer while collecting aquatics along the Main Branch of Newton Creek, at Collingswood, Camden County, noticed what appeared to be a large flowered and broad leaved *Nymphaea odorata* Ait. growing in the stream. As *Nymphaea odorata* does not appear to be recorded from this creek or its branches, the find seemed to be interesting. After floundering in the murky water, I was successful in pulling up several flowering specimens with good rootstocks. Careful examination showed that, growing at short intervals along the thickened rhizome, were small tubers which were readily detached and floated to the surface, and which when planted in mud, developed into new plants. Another surprising thing about the plant was the *green* under surface of the leaves!

When specimens were collected and compared with herbarium material at the Academy of Natural Sciences of Philadelphia, the plant appeared to be identical with *Nymphaea tuberosa* Paine. Since the occurrence of this species in the Philadelphia local area is rare, having been recorded only from three stations in southern New Jersey,[1] the plant was sent to Gray Herbarium to be checked by Messrs. C. A. Weatherby and J. M. Fogg, Jr., who together agreed that without doubt it was *Nymphaea tuberosa*.

This past summer another trip was made to the locality in order to note the distribution of the plant in the stream and, most important of all, to see whether or not this water-lily was indigenous there. Inquiry was made among several natives of Collingswood and it was ascertained that about ten years ago, an old inhabitant had received a rhizome of this species and had thrown it into the stream. The single specimen thus introduced has propagated itself, undoubtedly by seed and the small tubers, into the numerous colonies which are now present in the creek.

[1] "Known definitely only from Pocatquissing Creek and from near Trenton, both in Mercer Co., and from Cape May Co., N. J."—Norman Taylor, Flora of Vicinity of New York—Mem. N. Y. Bot. Gard. Vol. V.

As a further step in the investigation, the writer questioned the person from whom the original rhizome was received. He recollected having gotten some plants about twelve years ago for his private pool, from Pohatcong Lake, Tuckerton, New Jersey. In order to verify the plant's occurrence there, a trip was made by me to this lake. Unfortunately, due to the lateness of the season, there were no flowers left in bloom, except a small colony of *Nymphaea odorata* in a sheltered lagoon; however, the under surfaces of hundreds of leaves were examined. Most of them were the typical red color of *Nymphaea odorata*, but quite a number of colonies had leaves with green under surfaces, similar to the specimens from Collingswood. This latter fact, together with the presence of what appeared to be small tubers on the rhizomes, seemed to indicate that *Nymphaea tuberosa* Paine does occur in the lake. This would make the fifth station in southern New Jersey. However, until flowering specimens with rhizomes have been collected, and a more extensive study has been made, nothing with certainty can be said regarding its occurrence in Pohatcong Lake.

This article was written principally to record the presence of this rare species of water-lily at Collingswood, and also to give the history of its introduction in order to prevent confusion among botanists regarding its occurrence there, since in the future the local account of its introduction might be lost.

Herbarium of the University of Pennsylvania

Claytonia Chamissoi Ledeb. in Minnosota

John M. Holzinger

On August 7 of the present year of 1928, Mr. E. L. King agreed to establish a special plant refuge for the station of *Claytonia chamissoi*, since he owns the ground. It was on June 19, 1889, that I discovered a colony of this high altitude Rocky Mountain species in a short creek close to the west base of Queen's Bluff, on the bank of the Mississippi River. Its home is in the spray of the water falls along the crest range of the Rockies, 5000 to 7000 ft. above sea-level. Its Minnesota station is a bare 600 ft., or little more, above sea-level. So the colony is 2000 to 3000 miles from its natural home. A lonesome outpost.

After studying the plant for several seasons, and explaining certain discrepancies, I announced my find in the Plant World of March, 1901. By then I had become convinced that the plant is a perennial: it was described as an annual. It propagates by delicate stolons, which terminate in light flesh colored bulbils the size of rice grains. These are the vital perennating part of the plant. And the complete plant is figured in the Plant World, showing this mode of propagation.

Now, Britton and Brown's Manual (1901) includes Minnesota in the range of this Claytonia. But a little reflection will show that the Queen's Bluff station is in no ordinary sense an extension of the range. For in these 40 years—not a single new station has been reported from any of the states between the Rockies and the Mississippi River. The plant looks like a remarkable relict of the Ice Age. If so, it must have existed, and persisted, in its present obscure nook not less than 10,000 years. Some glacial geologists, to whom I have submitted the problem—Drs. Kay, Trowbridge, Sardeson—speak even of 100,000 years.

Claytonia chamissoi on the west bank of the Father of Waters, has thus a distinction of its own: it is entirely out of its range. If the theory is correct,—that it was brought by a glacier,—it also has the dignity derived from great age.

How could it persist thousands of years in one station?

Two factors combine to make this possible. First, the perennating bulbils referred to above; second, the seepage springs which line the short deeply shaded creek. Water perennially oozes out from the lower silurian sandrock on a level with the creek, keeping wet the carbonaceous mud forming from the decaying vegetation; but the key to the persistence of the plant is, that it is a strong hydrophyte. In its isolated station it seems to have long forgotten to produce seed since I have looked many times for ripe seeds, but have never found them. The reliance in this patch is entirely on the bulbils.

WINONA, MINNESOTA

Note on the Occurrence of Oxypolis filiformis in the Bahamas

L. J. K. BRACE

On a recent trip to the swamps that abound and form such a large part of New Providence I observed a white-flowered plant in both scattered and group state among the dwarfed plants of *Mariscus jamaicensis* (Crantz) Britton [*Cladium jamaicense* Crantz] in the swamps' margins.

This proved to be DeCandolle's *Tiedemannia teretifolia*,[1] which had not been gathered in by the various collecting parties observing for the "Bahama Flora." What makes it more interesting is the fact, as Dr. Britton has informed me, a distinct species has turned up in Cuba.[2]

This raises the question whether this latter plant may not also be found in these islands, presumably in the southern portion of the archipelago. Time alone can show this. It seems a pity more interest is not shown in the biology of these

[1] The synonymy is:—*Oxypolis filiformis* (Walt.) Britton, Mem. Torr. Club **5**: 239. 1894. *Oenanthe filiformis* Walt. Fl. Car. 113. 1788. *Oenanthe* teretifolia Muhl. Cat. 31. 1813. *Tiedemannia teretifolia* DC. Mem. Omb. 51. *pl. 12.* 1829.

On the continent this species ranges from southern Virginia to Florida and westward to Louisiana. N. L. B.

[2] *Oxypolis Bakeri* (Wolff), Britton & Wilson. *Tiedemannia Bakeri*, Wolff, in Urban, Symb. Ant. **5**: 452. 1908.

This closely resembles *O. filiformis* but has larger longer fruit. It is known only from marshes on the southern coasts of Havana and Santa Clara Provinces. N. L. B.

interesting islands; in many ways of more interest than larger areas. Waterfowl no doubt spread these plants so that nothing can be deduced perhaps from its presence as to the connection of the plant origin with the lands to the south or north of the group.

NASSAU, AUGUST, 1928.

A New Orchid from Louisiana

A Specimen of *Epidendrum conopseum* Ait. was found growing on the bark of a live oak tree, *Quercus virginiana*, at Greenwood Plantation, West Feliciana Parish, Louisiana. The orchid was noted for the first time during the summer of 1927 by Mrs. Edward Butler. A specimen was collected in August 1928 by Minna F. Koch, and deposited in the herbarium of Cornell University. This is the first time that *Epidendrum conopseum* has been reported from Louisiana, and it extends the range of this species westward.

MINNA F. KOCH

BOOK REVIEWS

A New Manual for the Flora of Ohio[1]

This book by Dr. Schaffner of the Ohio State University is an important addition to the list of local and state floras. The author states in the introduction that the book was prepared to present a "convenient means of identifying the plants of Ohio . . . . from fresh material gathered in the field."

All the species of Pteridophyta and Spermatophyta known from Ohio are given. The keys are the important feature of the book. They are quite detailed, so much so that the author has felt it unnecessary to give any descriptions of the families or species and only gives them for the genera as a check for the user of the keys. For the Equisetums keys are given that can be used with either fertile or sterile shoots. For one fairly well aquainted with technical botanical terms the keys are very clear and easily used, but for one not familiar with such terms the book may well seem discouraging. Of course there

[1] Schaffner, John H. Field Manual of the Flora of Ohio and Adjacent Territory, 638 pages. 1928. R. G. Adams and Co., Columbus, Ohio. $3.00.

is a glossary to all these terms at the back which will make it possible for anyone with patience to follow the keys through. It is to be regretted that in the keys to families—which occupy 31 pages–there are no page references, merely the family name and its number.

The scientific names used follow the standard American Code of priority and are generally those used in the 2nd edition of Britton and Brown's Illustrated Flora. Where the names used differ from those of the Flora synonyms are given. Names from the 7th edition of Gray's Manual are also given as synonyms. One "common name" is given for each species. Many or these are names already in common use, but some are merely literal translations of the scientific name.

No notes are given as to distribution or habitat, students being refered to the author's Catalogue of Ohio Vascular Plants, published in 1914. The addition of such notes would have slightly increased the size of the volume but greatly increased its value.

At the back of the book are keys to the woody plants of Ohio based on leaf and twig characters for summer use and on twig characters for winter use. These are quite similar to those in the authors Field Manual of Trees, with the addition of shrubby plants and the omission of trees not found in Ohio.

The book is well printed and attractively bound in black fabricoid. It is of a size to fit a coat pocket (but not a small one.) It will be of real help to botanists of Ohio and neighboring states and, once the terms are mastered, will be useful to those to whom it is dedicated,—the "lovers of the beauties of nature and of God's great, health-giving out-of-doors."

George T. Hastings

Moss Flora of North America[1]

This is the beginning of a new treatment of the *Musci* of the United States and northward. As in the author's earlier "Mosses with Hand-lens and Microscope," the illustrations

[1] A. J. Grout. Moss Flora of North America, North of Mexico. Vol. III, Part 1. 62 pages, with 14 plates. Published by the Author, New York, 1928. $2.50

are mostly taken from various older publications. The present work is a competènt attempt to treat completely and independently a geographical area whose moss-flora should by now be fairly well known, but is still greatly in need of revision. In starting with the third volume instead of the first the author is taking that group of genera with which he is most familiar, having published revisions of most of them a number of years ago. He has in the meantime changed his conceptions in some cases. That in his treatment of the *Hypnaceae* he emancipates himself entirely from the recent system of Brotherus-Fleischer in the second edition of Engler-Prantl is a welcome fact, but one is not always persuaded of the correctness of the conclusions reached. For example, the complete separation of *Pseudisothecium* (new genus) *myosuroides* and *stoloniferum* from *Isothecium viviparum* or *myurum* seems extremely dubious. The genus *Bryhnia* (maintained both by Grout and Brotherus-Fleischer) has never appealed to me as a natural group. The inclusion in *Bestia* of *Thamnium Holzingeri* and *Isothecium Brewerianum* and the segregation of *Brachythecium acuminatum* and two other closely related species as a new genus *Chamberlainia* are bold innovations. But whatever attitude of disagreement one may assume on this or that minor point, one is impressed here as always by the independent and essentially accurate scholarship of Grout, together with the paedagogical ability to make his publications clear and interesting, which has contributed so much to keep alive American bryology for a generation. This is a substantial contribution to our knowledge of North American mosses.

ITHACA, N. Y.

A. LEROY ANDREWS

PROCEEDINGS OF THE CLUB

MEETING OF NOVEMBER 14, 1928

The meeting was held at the American Museum of Natural History and was called to order by Vice-President Hazen at 8:30 P.M. The following candidates for membership were unanimously elected:

Mr. Louis Eisman, 45 Rockaway Ave., Brooklyn, N. Y.

Mr. Louis Lindstrom, 530 West 159th St. New York, N. Y.
Miss Clara Raska, 21–14 149th St. Whitestone, N. Y.

Mr William T. Davis presented a brief communication regarding a hybrid oak found by him last June at Westerleigh, Staten Island. This paper is printed in full in this number of Torreya.

Dr. Forman T. McLean addressed the Club on "Gladiolus and its Development from the Wild" showing about 100 beautifully colored slides and some autochrome plates. Dr. McLean spoke of the natural distribution of the wild species of gladiolus and traced the development of the garden forms up to the present time, beginning with the first Gandavensis hybrids of about 1840. His paper is published in full in this number of TORREYA.

ARTHUR H. GRAVES
Secretary

MEETING OF DECEMBER 4, 1928

The meeting was held at the American Museum of Natural History, and was called to order by Vice-President Hazen at 8:20 P.M. The following candidates were unanimously elected to membership:

Miss Fannie Asherowitz, 35 Osborn St., Brooklyn, N. Y.
Mr. Don O. Baird, 509 West 121 St., New York, N. Y.
Miss Rachel Beam, 540 Ocean Ave., Brooklyn, N. Y.
Miss Agnes W. Benedix, 3166 Webster Ave., New York, N. Y.
Mr. William Birrell, 60 East 94th St., New York, N. Y.
Miss Nancy Brenner, 635 West 169th St., New York, N.Y.
Miss Belle H. Burr, Brooklyn Botanic Garden, Brooklyn, New York.
Dr. R. H. Colley, 36 Argyl Place, Rockville Center, New York.
Mr. J. Joseph Copeland, Biology Department, College of N. Y. C., Convent Ave. & 139th St., New York, N. Y.
Miss Dorothy Francis, Biophysics Laboratory, Memorial Hospital, 2 West 106th St., New York, N. Y.
Miss Meriam Glassman, 1265 Walton Ave., Bronx, N. Y.
Mr. Oscar Goldin, 21 East 110th St., New York, N. Y.

Miss Ethel Greenburg, 749 West End Ave., New York, N. Y.
Miss Margaret A. Griffin, 45 Clark St., Paterson, N. J.
Mrs. Cecilia Mann Grossman, 103 East 15th St., New York, N. Y.
Miss Grace L. Holmes, 2309 Glenwood Road, Brooklyn. N. Y.
Mr. Arthur C. Lasswell, 500 East Fordham Road, New York, N. Y.
Miss Mary T. MacMurray, 8629–109th St., Richmond Hill, New York.
Miss Helen S. Morris, 2691 Creston Ave., New York, N. Y.
Miss Rosemary F. Mullen, 420 East 84th St., New York, N. Y.
Mr. William Rogenstein, 938 Longwood Ave., Bronx, New York City.
Mr. Albert Saeger, Junior College of Kansas City, Kansas City, Missouri.
Miss Adelaide Taub, 1517 Jesup Ave., Bronx, N. Y.
Miss Phyllis L. Taylor, 792 East 175th St., New York, N. Y.
Miss Elizabeth M. Tompkins, 134 Linden Blvd., Brooklyn. N. Y.
Miss Ruth N. Walker, 96 Winthrop Ave., Brooklyn, N. Y.
Miss Marie Wallfield, 1269 46th St., Brooklyn, N. Y.
Miss Coila B. Wright, 8625 Whitney Ave., Elmhurst, Long Island, New York.

The secretary spoke of the arrangements that had been made by the committee composed of the officers of the Club for a smoker given by the Torrey Botanical Club to visiting botanists at the December meeting of the A. A. A. S. in New York City. The smoker to be held at the Hotel Astor at about 10 p. m., immediately following the dinner of the Botanical Society of America. All members of the Club were urged to be present.

The scientific part of the program consisted of a paper by Dr. H. L. Shirley entitled, "The Ecological Importance of Light in the Growth of Forest Plants." His conclusions were as follows:

1. 1 per cent of full sunlight or more is necessary for the survival of the plants studied.

2. 8–15 per cent intensity is necessary for flowering and fruiting.

3. To insure reasonably good growth and the completion of the plant's life cycle the light intensity should be 20 per of full summer sunlight.

4. Shading to 50 per cent intensity during the summer may cause no marked decrease in the rate of growth and may be beneficial for some shade-loving plants.

5. In the forest, lack of vegetation under a canopy may be due to lack of soil moisture if it falls below the wilting coefficient, and to lack of light if it gets below 1 per cent intensity.

6. The complete solar spectrum is more efficient for the growth of plants than any portion of it.

7. The plants studied grow more efficiently without the red region of the spectrum, than without the blue region.

8. It seems highly improbable that sufficient change in light quality takes place in passing through a forest canopy to influence plant growth to any appreciable extent.

ARTHUR H. GRAVES
Secretary

NEWS NOTES

During the week of August 13th the Plant Science Seminar held its sixth annual session at the Massachusetts College of Pharmacy, Boston, Mass. The Chairman, Heber W. Youngken, in his address gave as the objects of the Seminar the bringing together of pharmacognosists for social contact and the exchange of ideas and methods, the acquisition of new facts by field trips and laboratory demonstrations, and the stimulation of research in connection with pharmacognosy and plant chemistry. He also referred to the fact that at the seminar herbarium specimens from different localities were to be exchanged.

Dr. John Merle Coulter, the "Dean of American Botanists" died on December 24, 1929. He served in several universities, becoming head of the department of botany at the University

of Chicago in 1896. He retired from Chicago a few years ago, moving to Yonkers to become a director of the Boyce Thompson Institute for Plant Research. He published the Manual of Rocky Mountain Flora, numerous text books of botany and was the founder and for many years the editor of the Botanical Gazette. He had been president of the Botanical Society of America and of the American Association of University Professors.

After thirty years of gratuitous service the original editorial board of Rhodora, journal of the New England Botanical Club has asked to be relieved and the council of the club has appointed a new board. The editor is now Merritt L. Fernald with James F. Collins, Charles A. Wetherby, Ludlow Griscom and Carroll W. Dodge as associate editors. (Science)

The Botanical Society of America held the largest meeting in its history during the Christmas holidays in connection with the meetings of the American Association for the Advancement of Science. The officers elected for the coming year are: President, Dr. Margaret C. Ferguson; Vice-president, Lester W. Sharp; Treasurer, George E. Nichols; Representative in the National Research Council, Ivy F. Lewis.

The Fifth National Shade Tree Conference was held at the Brooklyn Botanic Garden on February 7 and 8 with about seventy-five scientists and practical tree men in attendance. The purposes of these conferences is stated in the program of the meetings to be, "To stimulate greater interest in the study of Shade Tree Problems. To exchange ideas for enhancing the beauty and usefulness of shade trees." Various problems and phases of work with shade trees were discussed, such as, tree surgery, destructive diseases and insects, and methods of spraying and fertilizing.

In a news note in the Sept.–Oct. number of Torreya we spoke of the expedition to the Amazon of which Mr. Norman Taylor was the botanist. Since then the daily papers report the abandonment of the plans for an extensive exploration of the jungles of the Aripuna River. We have recently received interesting articles from Mr. Taylor describing the botanical

garden at Rio and the forests around Para. The first of these will appear in our next number.

The U. S. Department of Agriculture has recently published a circular, No. 46-C, Methods of Collecting and Preserving Pollen for use in the Treatment of Hay Fever.

The Department of Agriculture calls attention to the "increasing demand for wind-borne pollen" for making extracts with which to treat hay-fever patients.

Various methods of collecting pollen have been tried but they have not always proved entirely satisfactory for providing pollen in quantity and of acceptable purity. Improvements in such methods have been developed by the department which seem to adapt them to all requirements.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor, G. T. Hastings, 2587 Sedgwick Ave., New York when returning proof.

Reprints should be ordered, when galley proof is returned to the editor. George Banta Pub. Co., Menasha, Wisc. have furnished the following rates:

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50 "	1.81	3.19	4.67	5.61	7.31	8.52	10.34	10.28	15.56	19.08
75 "	2.14	3.68	5.33	6.21	8.36	9.62	11.49	12.37	17.21	21.94
100 "	2.47	4.18	5.88	6.98	9.07	10.78	12.60	13.69	19.30	24.25
150 "	2.97	5.06	7.15	8.36	11.22	13.31	15.62	16.72	23.48	29.48
200 "	3.85	5.55	7.86	9.18	12.44	14.85	17.38	18.53	25.90	32.56
300 "	4.23	6.82	10.12	11.77	16.33	19.30	22.55	23.15	33.22	41.14

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BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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TORREYA

Vol. 29 No. 2

March-April, 1929

The Botanical Garden at Rio de Janeiro

By Norman Taylor
Brooklyn Botanic Garden

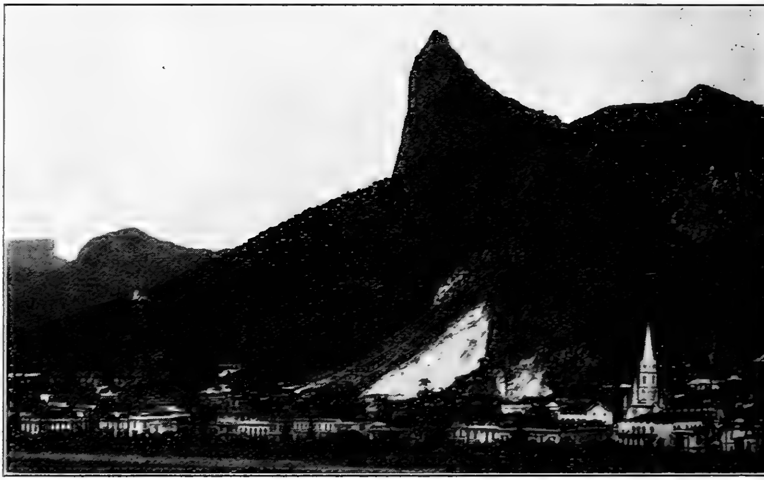
Amid a setting of unparalled grandeur the Botanical Garden at Rio de Janeiro contains one of the greatest outdoor collections of tropical plants in the world. Rio itself is a magic city huddled between the great mountains that fringe the bay and the sea. Up these mountains funiculars creep to dizzy heights and between two of them a cableway passenger basket swings crazily hundreds of feet in the air. The city is squeezed among these cliff-like mountains or sprawls up the sides of those with a gentle enough slope to permit building.

There are very few such gentle slopes, most of the hills having precipitous cliffs on one or two sides, and Corcovada (the Hunchback) has a sheer drop of 1200 feet on the side facing one of the uncomparably blue bays of Rio's much divided and almost lake-like harbor. Corcovada itself is over 2000 feet high and nature seems to have spent herself in throwing up many other peaks close by which shut in a comparatively small flat area between them and the sea.

It is in this area, and with this quite overpowering setting that the Botanical Garden was placed, first as the Jardim Fluminensis, in 1806, and years later as the Jardim Botanico. On two sides of it the forest creeps down to the very edge of the garden, and from the top of Corcovado, the highest peak in Rio, appears to be pushing the garden into the bay. On the other sides there is that vague air of squalor or cheap buildings quite reminding one of the "Botanic" garages, cigar stands and pharmacies that have spawned freely enough on the edges of the botanical gardens in Brooklyn and New York.

The dominant feature of Rio's garden is a long central path fringed by immense royal palms (*Oreodoxa regia*: I use their catalog nomenclature). Far to the end of this vista is a small Greek Temple erected to the goddess of palms. From the

steps of this "Dea Palmaris" one looks back along the Aléa Barboso Rodrigues, as they have called this palm fringed vista, to the sparkling blue water of the bay. All the other paths in the garden have been named for botanists, mostly South Americans. There is another avenue of these palms at right angles to the main one, and just inside the fence along the main street. This Caribbean plant, much planted elsewhere in Rio, grows so much taller than all other palms in the garden that it dominates everything else. The Emperor Dom João IV



Under the shadow of Corcovada, (The Hunchback) lies the luxuriance of Rio's Botanic Garden. This rocky peak is the highest and steepest of all the mountains in the city of Rio de Janeiro. Elevation 2310 feet.

decreed that all seed from the "mother palm" of this avenue, planted in 1809, should only be used for replacements in the Jardim Botanico. It is today perhaps the most widely used decorative palm in Brazil. It is nowhere wild.

From the street end of the avenue of royal palms there are many other paths radiating fan-fashion, and a large series of smaller ones cutting across these radii. This gives many small, irregular-shaped plots, all numbered, and quite often devoted to a single species, genus or family as their importance may dictate. There is no attempt to put on the ground a scheme of the presumed evolutionary development of plant families,

The allé of Royal Palms in the Botanic Garden at Rio. The trees are natives of the West Indies, but widely planted for ornament in Brazil.

according to the gospel of Engler & Prantl, Bentham & Hooker or the more current gods. Sometimes genera, and often families are widely separated, but as the developed part of the grounds does not exceed fifty acres this is no great hardship.

A good many of these main radii are fringed by one species of plant. There is, for instance, one devoted to the Jack-fruit

(*Artocarpus integrifolia*) just now hung with its great pitted fruits that grow out of the trunk or main branches, never among the twigs. As the larger fruits, are from 40–60 pounds in weight, the jaca as the Brazilians call this native of Eastern Asia, is a striking object. Another such avenue is lined with mango, another with *Chrysalidocarpus lutescens*, another with bamboo. In the bamboo path, very dense and shady, the pistol-like reports of their stems are startling in a high wind, and even in a mild one there is a constant moaning and crunching of stems. When a sudden high wind quickly wrenches loose two or three stems that have been locked together, they give out this noisy protest against such treatment.

Another avenue is lined with andiroba (*Carapa guianensis*) with its solitary pendulous fruits about the shape and size of an orange. It furnishes a widely used timber in Brazil. Fortunately its wood is not so hard or heavy as some Amazonian woods which are little used as they defy ordinary wood-working tools. There is no attempt to have anything like a complete growing collection of Brazilian timber trees, for it would cover hundreds of acres. Besides andiroba, however, there are mature specimens of the jacarandá (*Dalbergia Spruceana*), acapú (*Vouacapoua americana*), cedro (*Cedrela odorata*), angelim (*Pithecolobium racemiflorum*), and of course the pau Brasil (*Caesalpinia echinata*) the tree from which the country was named. Originally the Portuguese call Brazil "Vera Cruz." It gradually lost this name from the great amount of exported dye-wood called Brasil-wood which then gave to Brazil the name "the country of the Brasil-wood," subsequently "the Brasils" and finally its present name and spelling.* There are many other less known timber trees in cultivation and one famous one, the mahogany, which is nowhere native in Brazil.

The great richness of the palm collection is perhaps not surprising considering the immense wealth of palms in the country. The last guide book to the collections lists 160 species in cultivation in 1922. Obviously one cannot attempt here anything like complete notice of even a fraction of such a

* The name originally came from an eastern dye-wood called *bresil*, much imported into Europe by caravan and oriental shipping before the discovery of America. When the Portuguese landed at Bahia in 1500, they began cutting the local tree and quite naturally, and mistakenly, called it bresil.

variety of palms. But a few may be worth noting here for their size, economic importance or for other reasons. The largest palm in Brazil, a native of the drier parts of the country soon bids fair to be one of the most important. It is the babassú (*Orbigyna speciosa*), growing over huge tracts in Maranhão, and of which there are several nearly mature specimens in the Rio Garden. Picture an immense trunk-like caudex 3–4 feet in diameter, crowned at the top by tremendous pinnate leaves from 20–35 feet long. From this great crown hang 10–14 fruit clusters each with 300–400 incredibly hard nuts. In these are the babassú kernels so rich in oil that they are now occupying the attention of soap and margerine makers

Nearly as large and quite as impressive are various palms of the genus *Scheelea*, known collectively as anaja. They have pinnate leaves 20–30 feet long in young almost stemless specimens, while plants fifty feet high have leaves 15–20 feet long. *Scheelea osmantha*, particularly has a huge crown of leaves. Among other pinnate palms are fine specimens of the pupunha (*Guilielma speciosa*), much cultivated in the Amazon for its scarlet and yellow edible fruit; the piassaba (or piassave or even piaçaba) which yields valuable fiber and is the source of the coquilla nut; the extraordinary paxiuba (*Iriartea exorrhiza*) which grows perched up on a great series of *Pandanus*-like prop roots that are covered with tubercular prickles; the maraja (*Bactris maraja*) which has its clustered trunks covered with divaricate, black, flat spines about four inches long and has each leaflet ending in a long, fine herbaceous tip like a dripping tip; the macauba (*Acrocomia intumescens*) with a curious trunk thicker half way up than above or below this swelling and with its fruit clusters half hidden by the crowd of persistent dead leaves that always clothe the trunk; the African oil palm, or dende as they call it at Rio (*Elaeis guineense*), now considerably cultivated in Brazil for its oil; and the urucury (*Attalaea excelsa*), the fruits of which, with a few others, are still used in the coagulation of rubber.

There are not so many fan palms. The most striking is perhaps the miriti (*Mauritia flexuosa*) which, in striking contrast to many Brazilian palms is completely free of spines. It has petioles 12–15 feet long and blades 9–10 feet wide. The fruits and buds are eaten, wine is made from its sap, a kind

of sago from the stem and cordage from the fiber of the leaf-bases. One other palm is worth mention, an unnamed Asiatic species of *Calamus*. An inextricable mass of its climbing stems and long shiny foliage sprawled up a great dead tree, the plant measuring over all perhaps 90 feet high and 70 feet wide. Scores of its slender stems, no thicker than a broomstick had climbed down to the ground and were sprawled over the lawn and all but barricading one of the paths.

Whole sections of the garden are devoted to Bromeliaceae, and hundreds more are epiphytic on palm stems, trees, fence posts, and even in the gutters of adjacent buildings. Few of these were in flower at this season (December) which is at the beginning of Rio's spring. Nor, except for *Cattleya* and *Laelia*, which are everywhere hawked about Rio in gorgeous profusion, are any of the orchid collection in flower. The orchid house consists only of a greenhouse-like frame, screened with chicken wire.

There is, too, a large section devoted to medicinal plants, among them the wholly unknown (in America) Guarañá (*Paullinia cupana*) from the seeds of which a paste and powder have been made for three hundred years. It is widely used in Brazil as a fatigue destroyer and has been investigated by Metchnikoff. Dr. Roquette-Pinto, Director of the National Museum at Rio assures me that its value is unquestioned, and that, like coffee, it leaves no deleterious after affects. It contains about three times the amount of caffeine in coffee, and is used to flavor a nationally used soft drink, *Guaraná*.

The charm of Rio's garden does not depend upon the plants I have mentioned, nor upon hundreds of others, but upon the way they have been used. While scores are grown as individual specimens on the lawn, many are grouped in great masses. There has been effective and judicious use of statues, fountains, water, bridges and grottoes so that quite apart from its scientific value the garden is a much appreciated place of quiet retreat. It is extremely well policed and these are signs in Portuguese. French and a few in English to warn or help visitors.

Of course there is a library and herbarium, the latter, to minimize insect depredations, is kept in hundreds of tin boxes, which is cumbersome but absolutely necessary in a building, with no glass windows or screens and in a country

as rich in insects as Brazil. The very large herbarium at the National Museum at Rio is similarly housed.

There is a pool in one part of the grounds, largely devoted to the Amazonian *Victoria regia*, now one of the best known and most famous water lilies in the world. It needs no comment except to note that here none of its leaves are over four and one half feet in diameter. Dr. Campos-Porto, one of the curators, stated that this was as large as he had ever seen it, so that tales of six or even seven feet in diameter may be stretching dimensions a bit.

RIO DE JANEIRO, BRAZIL.
DECEMBER 7, 1928.

Development of the Vegetation Inside the Levee Following the High Water of 1927

By Clair A. Brown

In July 1926 a new levee was constructed about three miles south of Baton Rouge, La., and opposite the site of the new campus of Louisiana State University. This section of the levee runs approximately north and south and the river side or the "inside" of the levee slopes to the west. In the construction of the levee a depression was excavated many feet from the river bank (section A to B Fig. 2). The earth removed was used to build up the levee. The strip of land parallel to the levee is surrounded by water when the river reaches a height of twenty-five feet on the guage, stage known as "bank full." This strip for convenience has been termed the "Island" and corresponds to section "C" of the profile in figure 2.

In October 1926 the writer visited this place for the first time and found a large, relatively bare mound of earth with many little gullies cut in the levee by the rains. At this time there were six species of plants found growing on the river side of the levee, none very abundant, but conspicuous on the bare earth.

Senecio lobatus Pers	*Medicago lupulina* L.
Sonchus asper (L). All.	*Capriola Dactylon* (L). Kuntze
Erigeron philadelphicus L.	*Rumex* sp. basal rosettes.

Since it was impossible to reach the "island" without a boat, a complete list of the plants on the island is lacking, but it was covered with vegetation. The most conspicuous forms were Salix, Populus, Platanus and Adelia.

At this time the river was running at "bank full" and in the latter part of December rose to the "flood stage" of thirty-five feet. The water stayed at the flood stage until April 1927, when a rapid rise started, which culminated in one of the worst floods ever experienced in the lower Mississippi valley. The water reached the high peak of 47.9 feet May 15, 1927, and it is believed that it would have gone higher if breaks had not occurred. The elevation of the levee at the point of the writers observations was 49 feet. The accompanying graph shows the

differences in river heights from September 1926 to September 1927 and from September 1927 to June 1928 (Fig. 1).

The profile (Fig. 2) shows the elevation of the points mentioned, and the general topography from the road to the river. The ground from the high point of the levee to the point designated as "A" was practically bare of vegetation in October 1926. A to B was covered with water at the time of the first

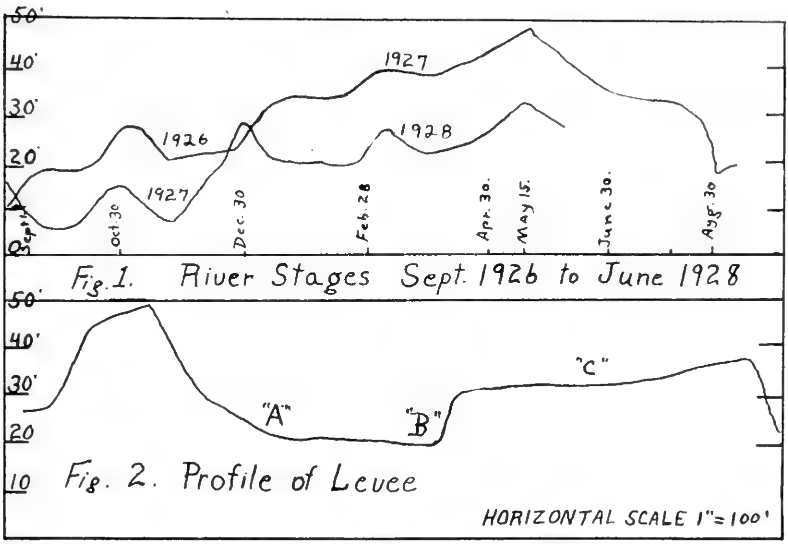


Fig. 1. River Stages Sept. 1926 to June 1928

Fig. 2. Profile of Levee

visit. C is the region called the "Island," which when the level of the river drops below twenty-two feet is continuous with the rest of the levee.

In October 1927 the writer again visited the levee, and the change that had taken place was astonishing. The water between points A and B was gone. The region from the top of the levee to A was one complete mass of vegetation. The stretch from A to B as the photograph shows, consists of patches of plants scattered over the bare ground. A strip about 500 feet long and extending from the top of the levee to the water's edge was selected as a typical area of the newly vegetated levee and carefully botanized

One of the striking features of the vegetation was the complete mat of *Eragrostis hypnoides* (Lam.) B.S.P. which covered all the slope down to point A. Through this carpet of grass the other plants protruded.

Another conspicuous feature was a series of rows of willow and poplar seedlings which marked quite closely the different heights of the receding waters.

Since water covered the "island" for approximately three months the first thought was what damage was done to the vegetation. The exact status of the herbaceous plants on the "island" was not known before the flood, and this question cannot be answered completely. The following plants withstood the effect of being submerged or partly submerged for that period of time.

Salix nigra Marsh.	*Salix longifolia* Muhl.
Populus deltoides Marsh.	*Adelia acuminata* Michx.
Platanus occidentalis L.	*Amorpha fruticosa* L.
Gleditsia aquatica Marsh.	*Rhus Toxicodendron* L.
Ampelopsis cordata Michx.	*Rubus trivialis* L.
Ampelopsis arborea (*L.*) Rusby	*Rubus* sp.
Smilax Bona-nox L.	*Aster* sp.—a perennial with
Cyperus rotundus L.	horizontal rootstalks

The other plants found on the "island" may have grown to maturity from seeds after the waters receded. It appears that the water aided in the germination of seeds as well as carrying seeds which came from plants not found in the immediate vicinity. Seeds of *Hicoria aquatica* Michx., *Hicoria minima* Britton (?), *Quercus macrocarpa* Michx., and *Mohrodendron*, which did not germinate were found on the ground. All of these came from a distance of more than three miles since the species mentioned are not represented between this locality and town.

Willows that had been submerged produced a mass of adventitious roots from the branches of the thick-barked old trees, and from the trunks of the smaller thin-barked trees. From a distance the trees appeared to be draped with spanish moss.

No detailed comparative studies were made to compare the amount of annual increment between the flooded and non-flooded trees, altho there appears to have been a decrease in the annual increment as compared with the increment of the previous year.

In a mimeographed letter from the Southern Forest Experiment Station, G. H. Lentz reports the killing of red gum, ash, elm, hickory, and oaks, especially the young seedlings which were submerged for some time. In one locality in Madison

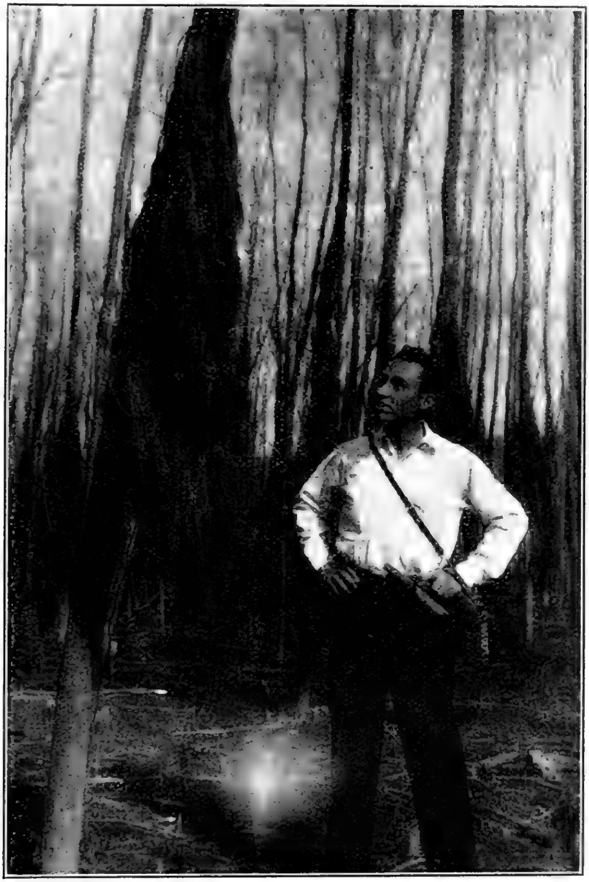


Photo by Brown.

Adventitious roots from the trunk of a willow sapling.

Parish, he reports a killing of approximately 60% of the trees examined.

Since the levee back of the college was newly constructed it was thought advisable to compare the vegetation with that of an old levee. A point was chosen on the opposite shore

Photo by Edgerton.

Looking west, from the top of the new levee. Note the density of vegetation from A to B and on the "island" C.

about three miles south of Port Allen, La. This levee had a longer and flatter base which is very sandy and in places mixed with silt loam. On this bench the vegetation was not as thick as on the new levee. However the slope of the levee proper had a thick sod and contained a smaller variety of plants as compared to the slope of the new levee. As this spot had never been visited before, it is impossible to compare the effects of the flood on the old levee. A study of the lists of plants from both sites does not show many differences.

In October 1927 the writer visited Melville, La. and other points in the flooded region. All along the road one could see the high water mark, on fences, trees, and buildings. The water mark was a foot or so above the ground in some places, a foot or more above the tops of the windows of the houses in others.

In this region the most striking feature was the abundance of two weeds, *Xanthium chinense* Mill. and *Croton* sp. These were so abundant as to appear as if they were planted crops. An examination of this region in March 1928 shows that there is a high percentage of germination of the cocklebur as well as other weeds.

Specimens of most of the plants listed have been preserved in the Louisiana State University Herbarium. Many duplicates have been sent to the New York Botanical Garden and to the University of Michigan Herbarium.

The nomenclature mainly follows that of Small's "Flora of Southeastern United States."

Plants found on the East side of the River from the top of the new levee to the "Island."

TREES

Salix nigra Marsh. Seedlings.
Salix longifolia Muhl. Seedlings.
Populus eeltoides Marsh. Seedlings.

SHRUBS

Cephalanthus occidentalis L.

HERBS

Alismaceae
Lophotocarpus calycinus (Engelm.) J. G. Smith

Poaceae
Eragrostis hypnoides (Lam.) B. S. P.
Eragrostis glomeratus (Walt.) Dewey
Capriola Dactylon (L.) Kuntze
Sorghum vulgare Pers. (var. Durra Bailey?)

Cyperaceae
Cyperus 4 sp.
Fimbristylis autumnalis (L.) R. & S.
Fimbristylis Vahlii (Lam.) Link.

Commelinaceae
Commelina nudiflora L.
Commelina hirtella Vahl.

Amaranthaceae
Amaranthus viridis L.

Tetragoniaceae
Mollugo verticillata L.

Brassicaceae
Roripa palustris (L.) Bess.
Roripa obtusa (Nutt.) Britton

Mimosaceae
Mimosa strigiilosa T. & G.

Fabaceae
Strophostyles helvola (L.) Ell.

Euphorbiaceae
Chamaesyce nutans (Lag.) Small

Malvaceae
Sida rhombifolia L.

Lythraceae
Ammannia coccinea Rottb.
Rotala ramosior (L.) Koehne

Epilobiaceae
Jussiaea decurrens (Walt.) DC.
Jussiaea leptocarpa Nutt.

Convovulaceae
Ipomoea lacunosa L.
Ipomoea triloba L.

Solanaceae
Physalis angulata L.

Verbenaceae
Verbena 2 sp.
Phyla lanceolata (Michx.) Greene

Rhinanthaceae
Ilysanthes inaequalis (Walt.) Pennell
Conobea multifida (Michx.) Benth.

Rubiaceae
Diodia virginiana L.

Cucurbitaceae
Citrullus Citrullus (L.) Small
Sicyos angulata L.

Ambrosiaceae
Xanthium chinense Mill.

Carduaceae
Conoclinum coelestinum (L.) DC.
Aster 3 sp.
Pluchea petiolata Cass.
Spilanthes repens (Walt.) Michx.
Eclipta alba (L.) Hassk.
Bidens discoidea (T. & G.) Britton
Bidens frondosa L.
Parthenium Hysterophorus L.

Cichoriaceae
Sonchus asper (L.) All.

Plants found on the "Island"

TREES

Salix nigra Marsh.
Salix longifolia Muhl.
Platanus occidentalis L.
Populus deltoides Marsh.
Gleditsia aquatica Marsh.

SHRUBS

Adelia acuminata Michx.
Amorpha fruticosa L.

VINES

Ampelopsis arborea (L.) Rusby
Ampelopsis cordata Michx.
Smilax Bona-nox L.
Campsis radicans (L.) Seem.
Rhus Toxicodendron L.

Herbs

Typhaceae

Alismaceae
Sagittaria sp.

Poaceae
Eragrostis hypnoiees (Lam.) B. S. P.
Eragrostis glomeratus (Walt.) Dewey
Leptochloa filiformis (Lam.) Beauv.
Eleusine Indica (L.) Gaertn.
Syntherisma sanguinale (L.) Dulac.
Paspalum eilatatum Poir.
Panicum capillare L.
Panicum dichotomiflorum Michx.
Echinochloae colona L.
Echinochloae crus-galli var. *mitis* (Pursh) Peterman

Cyperaceae
Cyperus 4 sp.
Fimbristylis autumnalis (L.) R. & S.

Commelinaceae
Commelina nueiflora L.

Polygonaceae
Persicaria sp.

Chenopodiacae
Chenopoeium ambrosioiees L.
Chenopodium anthelminticum L.

Amaranthaceae
Amaranthus retroflexus L.
Amaranthus viridis L.

Tetragoniaceae
Mollugo verticillata L.

Brassicaceae
Roripa palustris (L.) Bess.

Rosaceae
Rubus trivialis L.
Rubus sp.

Fabaceae
Sesban exaitatus (Raf.) Rydb.
Strophostyles helvola (L.) Ell.

Euphorbiaceae
Croton capitatus Michx.
Acalypha Virginica L.
Chamaesyce humistrata (Engelm.) Small

Malvaceae
Hibiscus lasiocarpus Cav.
Sida rhombifolia L.

Lythraceae
Ammannia coccinea Rottb.
Rotala ramosior (L.) Koehne

Epilobiaceae
Jussiaea decurrens (Walt.) DC.
Jussiaea leptocarpa L.

Dichondraceae
Dichonera carolinensis Michx.

Convolvulaceae
Ipomoea lacunosa L.
Ipomoea triloba L.

Solanaceae
Solanum nigrum L.

Heliotropiaceae
Heliotropium Ineicum L.

Verbenaceae
Phyla lanceolata (Michx.) Greene

Rhinanthaceae
Mimulus ringens L.
Ilysanthes inaequalis (Walt.) Pennell
Conobea multifida (Michx.) Benth.

Rubiaceae

Dioda virginiana L.

Ambrosiaceae

Xanthium chinense Mill.
Ambrosia artemisiifolia L.
Iva caudata Small.

Carduaceae

Conoclinum coelestinum (L.) DC.
Aster 3 sp.
Pulchea petiolata Cass.
Spilanthes repens (Walt.) Michx.
Eclipta alba (L.) Hassk.

Cichoriaceae

Sonchus asper (L.) All.

Plants found inside of the old levee on the west side of the river.

TREES

Salix nigra Marsh.
Salix longifolia Muhl.
Populus eeltoides Marsh.
Platanus occidentalis L.

HERBS

POACEAE

Eragrostis hypnoides (Lam.) B. S. P.
**Eragrostis caroliniana* (Spreng.) Scribn.
Eleusine Indica (L.) Caertn.
Capriola Dactylon (L.) Kuntze
Syntherisma sanguinale (L.) Dulac.
Chaetochloa glauca (L.) Scribn.
Panicum eichotomiflorum Michx.
**Panicum capillare* L.
Echinochloa crus-galli var. *mitis* (Pursh) Peterman

Cyperaceae

Cyperus rotuneus L.
**Cyperus* 4 sp.
**Fimbristylis autumnalis* (L.) R. & S.
**Fimbristylis Vahlii* (Lam.) Link

Polygonaceae

**Persicaria* sp.

Chenopodiaceae

**Chenopodium ambrosioiees* L.
**Chenopoeium anthelminticum* L.

Amaranthaceae

**Amaranthus anthemifolia* L.

Tetragoniaceae

Moilugo verticillata L.

Brassicaceae

Roripa palustris (L.) Bess.
**Roripa obtusa* (Nutt.) Britton

Mimosaceae

**Mimosa strigiilosa* T. & G.

Fabaceae

Strophostyles helvola (L.) Ell.
Sesban exaltatus (Raf.) Rydb.

Euphorbiaceae

**Chamaesyce humistrata* (Engelm.) Small
**Croton* sp.

Malvaceae

**Siea acuta* Burm.

Loganiaceae

**Polypremum procumbens* L.

Sapindaceae

**Careiospermum Halicacabum* L.

Lythraceae

Ammannia coccinea Rottb.
Rotala ramosior (L.) Koehne

Epilobiaceae

Jussiaea decurrens (Walt.) DC.
Jussiaea leptocarpa L.

Convolvulaceae

**Ipomoea lacunosa* L.
**Ipomoea triloba* L.

Solanaceae

Solanum carolinense L.

Heliotropiaceae

Heliotropium Indicum L.
**Heliotropium Europaeum* L.

Verbenaceae
Phyla lanceolata (Michx.) Greene

Rhinanthaceae
Ilsanthes inaequalis (Walt.) Pennell
Conobea multifida (Michx.) Benth.

Rubiaceae
Diodia virginana L.

Cucurbitaceae
*One species not yet identified

Ambrosiaceae
**Xanthium chinense* Mill.
**Iva caudata* Small.

Carduaceae
Conoclinum coelestinum (L.) DC.
**Aster* 3 sp.
**Solidago* sp.
**Spilanthes repens* (Walt.) Michx.
Eclipta alba (L.) Hassk.

NOTE. Plants starred were collected and in the herbarium. The others were recorded in the field notebook.

LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA.

The Present Range of Potamogeton crispus L. in North America

L. R. Tehon

The afternoon of August 24, 1928, while Dr. David H. Thompson and the writer were engaged in a brief survey of the aquatic plants making up the weedbeds of Lake Nippersink, in Illinois, we picked up a fragmentary branch of *Potamogeton crispus*. In the short time then at our disposal, we were not able to make a thorough search for more of it; but as other pondweeds, such as *P. americanus*, *P. Richardsonii*, *P. compressus*, and *P. foliosus*, were obtained in abundance during the afternoon, it is probable that *P. crispus* was not abundant there. This small specimen, taken by chance, provides the only record we have of the occurrence of the plant in that lake; and it is, moreover, the only specimen of *P. crispus* that we have obtained in Illinois waters, though during the past four seasons we have collected in many places.

This pondweed is considered to be an introduced species, possibly of European origin; and both the manuals and the monographs agree in assigning to it a very limited range in a few East Coast States. The latest range, as given in Norman Taylor's[1] monograph of 1909 is from "Ontario to Delaware and eastern Pennsylvania." As our specimen seemed, in contrast with this, to indicate a considerable westward extension, I undertook to search out additional evidence of its spread, both as recorded by specimens deposited in herbaria and by printed observations.

The earliest printed note on the range extension of the species is by Dr. Morong,[2] who inadvertently made it a matter of record at the Buffalo meeting of the "American Association" that *P. crispus* had occurred in Arizona. This was seven years before the appearance of his monograph[3]; but in the monograph itself he does not mention the Arizona instance, probably because he supposed it to have been too rare and far removed from the abundant range to be duplicated soon.

[1] North American Flora 17^1: 21–22.

[2] Bull. Torrey Bot. Club 3: 171. 1886.

[3] Memoirs of the Torrey Botanical Club 3^2. 1893.

The only other significant note is Edwin D. Hull's report[4] in 1913 of the presence of *P. crispus* in the lagoons of Jackson Park, Chicago, and in Wolf Lake, Indiana. In these waters, which are in direct connection with Lake Michigan and close to the lakeshore, this pondweed had been well known to Mr. Hull since 1909; and in the lagoons it had become so abundant as to be a nuisance. But in Chicago's Washington Park, about a mile westward from the lakeshore, lagoons not connected with the lake yielded Mr. Hull no specimens.

Lake Nippersink, in which our chance collection was made, lies near the northwest corner of Lake County, 20 miles west of Lake Michigan and about 45 miles northwest of Jackson Park. It is one of a number of glacial lakes in Illinois and Wisconsin that are drained by the Fox River, a tributary of the Illinois River and one of the headwaters of the Mississippi System.

Our collection and Mr. Hull's note record, within a distance of 50 miles, the presence of this pondweed in two great river systems. There is, of course, direct water connection between the two, by way of the reversed flow of the Chicago River and the Drainage Canal; and if these were the only records at hand this might serve as a plausible though unlikely explanation of the two occurrences.

As a result, however, of the courteous response given my inquiries by the botanists in several important herbaria, I have at hand a large list of specimens of *P. crispus*, in which I find three citations of particular interest. From the Brooklyn Botanical Garden, Norman Taylor cites two specimens, the first taken by D. Griffiths in July, 1896 in Edmonds County, South Dakota, the second taken by D. Griffiths and E. L. Morris August 19, 1901 near Silvies in east-central Oregon. And from the University of Wisconsin Herbarium J. J. Davis has very obligingly sent for my inspection a specimen taken by N. C. Fassett and L. R. Wilson (No. 4348) August 26, 1927 from the Minnesota side of the Mississippi near Kellogg.

These records give to *P. crispus* an almost cross-continental range; but our Illinois specimen, in company with three Michigan specimens cited to me by Professor Darlington as having been collected in Van Buren County (L. H. Pennington, 1910) and in Black Lake and Pigeon Lake two years ago, as well as

[4] Rhodora 15: 171–172.

Professor Macoun's[5] much older record from the Canadian side at Niagara, furnishes conclusive evidence that this pondweed has for some years been well established westward. Indeed, it may be added that Professor Henry Oosting, who made the Black Lake and Pigeon Lake collections in Michigan, has written me that in 1928 he collected *P. crispus* in Lake Minnetonka, Minnesota, though at the time he received my inquiry he was not able to find his specimen.

The time when *P. crispus* was first brought to the North American continent, and the place in which it found its first foothold, must of course remain conjectural. With the exception of the two Americas, it is of nearly world-wide distribution, ranging through most of Europe, thence across Asia to Japan and Korea and southward into Africa and Australia. According to Arthur Bennett,[5] the oldest dated American specimen is labeled "Philadelphia, 1841–2. Gavin Watson & Kilvington," though "one from Delaware . . . . is probably older; it was collected by R. Eglesfeld Griffith, of Philadelphia." It appears certain that this plant has been in American waters for a century—perhaps much longer—and its abundance in the East, shown by the preponderance of collections from that region, indicates that it may have become established there first.

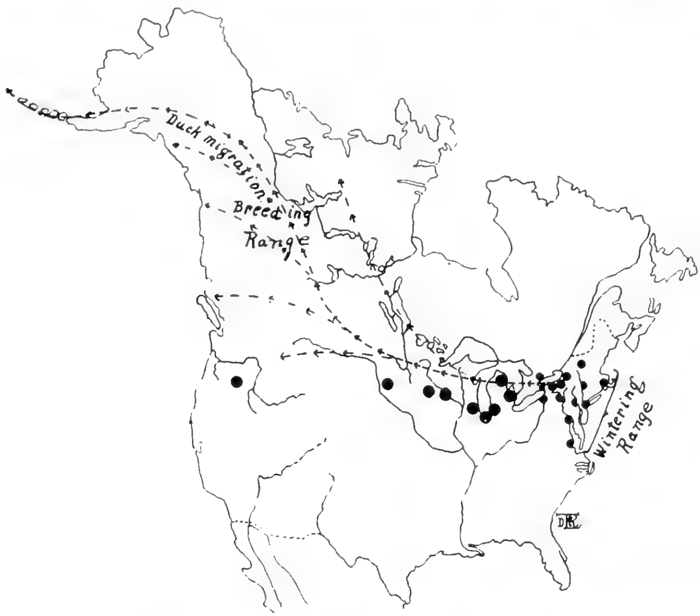
Its subsequent spread westward might be attributed to a variety of agencies, but it seems to me most likely that aquatic birds have been the most important. There are more than 50 species which regularly visit the United States for some part of each year; those that breed commonly in the Northern States are of 19 species; and those that breed far northward but winter in the States number more than 20 species. For 16 important species of game ducks, McAtee[6] reports that pondweeds constitute from 4 to over 40 per cent. of the food and that the average proportion of pondweed in the food of these species is 13.88 per cent.

Commonest among our ducks is the Mallard. Wintering chiefly in the southern half of the Mississippi Valley, but also casually as far east as Massachusetts, it breeds in the summer throughout a large territory ranging from the northern States far into Canada. The Canvasback, formerly much more abun-

[5] Jour. Bot. 39: 201. 1901.

[6] U. S. Dept. Agr., Biol. Survey. Bull. 81. 1911.

dant that it now is, wintered in enormous numbers in the Chesapeake Bay region and in the spring followed the line of the Great Lakes northwestward for more than a thousand miles to breed in Alberta. No duck has a northwest-southeast migration more marked than that of the Scaup. In the winter, it is to be found in greatest abundance near the Atlantic Coast from



The relation of duck migration to the distribution of *Potamogeton crispus* in North America.

The range of *P. crispus* is shown by the black circles. In the East the small circles represent the general range of the plant, rather than individual localities, while the larger circles in the West mark the locations from which the isolated western collections were taken. The direction of the migration routes of the Canvasback and the Scaup are shown by the dotted arrowlines.

Chesapeake Bay to Massachusetts; but in the spring, generally following the chain of lakes from Ontario through to the Great Slave, it moves to a breeding ground that extends from North Dakota to Great Slave Lake, Sitka, and the entire length of the Aleutian Chain.

These birds are among the most voracious pondweed eaters. The figures given by McAtee in the paper mentioned above are:

of the Mallard's food 12.67 per cent. is pondweed; of the Canvasback, 42.35; and of the Scaup, 23.2 per cent.

When the localities represented by my list of specimens have been spotted on a map, the belt of occurrence shown thereby rather roughly resembles an old and well-worn broom. Beginning in the East, the loosened straws end along the Atlantic Coast, from Virginia and Chesapeake Bay northward to Massachusetts and Toronto. Thence westward, they converge, by way of the Susquehanna, Delaware, Hudson, and other streams, at Lake Ontario, where they are bound to the shaft. At Lake Michigan the upper ends of the bound strands have broken out in the Michigan and Illinois localities; and the course of the broom handle is marked, westward, by the isolated collections in Minnesota, South Dakota, and Oregon.

Though the lines of spread from the Atlantic inland are almost indistinguishable, the general course is that followed by migrating ducks; and it appears wholly reasonable to regard them as the carriers. Indeed, I cannot repress the suggestion that the bringing of the crisp pondweed to North America is attributable with far less certainty to the hand of man than to such birds as the European Widgeon, which has been caught straying on this continent more than eighty times.

Illinois State Natural History Survey
Urbana, Illinois.

PROCEEDINGS OF THE CLUB

Meeting of January 16, 1929

This meeting was held at The New York Botanical Garden, with 29 members present. The minutes of the annual meeting of January 8 were read and approved. The President reported the following changes in the standing committees:.

Finance Committee, R. A. Harper, J. H. Barnhart, Sereno Stetson, Mrs. Helen M. Trelease.

Local Flora Committee, cryptogams, Miss C. C. Haynes was added.

Program Committee, Forman T. McLean was added, making the committee as follows: Forman T. McLean, Mrs. E. G. Britton, Wm. Crocker, A. H. Graves, T. E. Hazen, and M. A. Howe.

Dr. Barnhart made the following report of the budget committee:

Estimated Income		*Estimated Outgo*	
Membership Dues	$1,900.00	Bulletin	$2,600.00
Bulletin	1,250.00	Editor, Bulletin	100.00
Torreya	150.00	Torreya	600.00
Memoirs	100.00	Index cards	650.00
Index cards	900.00	Treasurer	150.00
Advertisements	100.00	Bibliographer	150.00
		Sundries	150.00
	$4,400.00		
			$4,400.00
		Available surplus for Memoirs (or Bulletin)	$ 600.00

This budget was adopted by the Club.

The following new members were proposed and unanimously elected:

Mr. Alexander Apisdorf and Miss Elizzbeth Kargus.

The resignation of Dr. Harold Sands was accepted with regret.

The Auditing Committee has examined the accounts of the treasury and find that they are correct and in excellent condi-

tion. The report was signed by R. A. Harper and Tracy Hazen.

Dr. Sinnott, Dr. Graves, Mrs. Harper, Mrs. Hastings, and Mrs. Dodge have been asked to act on the Entertainment Committee.

Mr. Ernst J. Schreiner spoke of Aeroplane Dusting of spruce forests with insecticides to kill the spruce bud work. These experiments were carried out by the Entomological Branch of The Canadian Department of Agriculture during June, 1927. The first step was to lay out a number of plots 800 feet by 400 feet. The aeroplane was supplied by The Dominion Air Board. Test flights were made to determine the ground speed of the aeroplane and to determine the rate of delivery of the dust. Two kinds of dust were tested, calcium arsenate and lead arsenate. These dusts are poisonous to caterpillars and if they are small it will not take much dust to kill them. Calcium arsenate distributed at the rate of 20 pounds to the acre was found to be effective. Large poles with flags, tall enough to stand out above the trees were tied into the tops of corner trees, so the aviator could see the flag and know just where to dust. Dustings had to be done early between four and six o'clock in the morning. The reasons for dusting at that hour was that there was no wind. The least wind blows the dust long distances and prevents even distribution. Moisture makes the dust stick a little better early in the morning. Cape Breton didn't seem calm enough to dust in the evening. The aeroplane travelled ten to forty feet above the tree tops and west at the rate of ninety miles an hour. An aeroplane dusts five acres a minute. One thousand five hundred pounds can be taken in one aeroplane.

Dr. Fred J. Seaver spoke on an interesting phalloid. He stated that almost everyone is familiar with the phalloids because these plants have a way of forcing themselves to our attention whether we are interested or not.

To illustrate this he called attention to an incident which occurred several years ago while summering in Connecticut: Their next door neighbors were very much disturbed because, as they supposed, a small animal had crawled under their front porch and had been so inconsiderate as to die there, emitting after a few days an offensive odor. The speaker was not there at the time, but his wife, who happened to be familiar with the characteristics of this fungus called their attention to a phalloid

which was growing in the middle of their lawn. They were very much relieved and at the time very much interested in knowing that such a little fungus could cause such a big commotion. Such incidents as this are a very common occurrence.

In addition to their odor, which is attractive or offensive, according to the point of view, these plants have other features which render them very attractive. Some of the forms growing in the Tropics, especially *Clathrus*, are very brilliantly colored. Probably both the color and the odor serve to attract insects which aid in the distribution of the species.

During the past summer the speaker was interested in collecting in The New York Botanical Garden a large number of specimens belonging to the genus *Colus*. This genus is represented by six species growing in Africa, Australia, Ceylon, South America, and Java. About twenty years ago a new species, *Colus Schollenbergiae*, was described from Pittsburgh, Pennsylvania, and is the only species of the genus known in North America. The plants collected in The New York Botanical Garden are probably identical with that species. The American species, however, is very similar to the one found in Java and there are two questions which are still unanswered: (1) Is the American species different from the foreign species, and if so, why has it not been more frequently collected in America? (2) If, as would appear, it is identical with the Java species, how did it get here and why should it have been found once in Pittsburgh and once in New York City?

The meeting adjourned at 4:35 P.M.

Respectfully submitted,
FORMAN T. MCLEAN,
Secretary

NEWS NOTES

Dr. Raymond H. Wallace, National Research Council Fellow at Columbia University, has been appointed assistant professor of botany at the Connecticut Agricultural College. Associate Professor G. Safford Torrey has been appointed professor of botany, and succeeds Dr. Edmund W. Sinnott as head of the department.

Dr. A. J. Grout, bryologist, will be at the Biological Laboratory at Cold Spring Harbor this coming summer from the end

of June to the middle of July for work on the identification and ecological relations of the moss flora of the region.

The U. S. Department of Agriculture has published a bulletin, 1072-F, entitled Prickly Pear as Stock Feed. The various forms of prickly pear are valuable as stock feed, especially in times of drought. The spiny varieties may have the spines burned off with a gasoline torch or be chopped by machinery. The plants may survive severe droughts for many months, but requires a good water supply at some time each year. They are growing in favor in the southwest as succulent forage that may take the place of silage.

At the annual science dinner of the teachers of biology, chemistry and physics in the New York High Schools on April 20th, Dr. Stewart Gager, Director of the Brooklyn Botanic Garden gave an address on the effects of radium on the development and inheritance of plants.

At the annual meeting commerative of the birth of Charles Darwin of the Botanical Seminar of the Michigan Agricultural College Dr. John H. Schaffner of Ohio State University delivered an address on Experiments in the Control of Sex in Plants.

The volume on "The North American Cup-fungi" by Dr. Fred J. Seaver of The New York Botanical Garden, a preliminary notice of which appeared in an earlier number of Torreya was issued in December, 1928. For a number of years the author of this work has been a member of the Local Flora Committee of the Torrey Botanical Club, the cup-fungi being one of the groups assigned to him for study. While the present volume is not restricted to the local flora, it includes all the forms of this particular group known within the local flora range and should therefore be of interest to the members of the Club. It is expected that this will be followed after a few years by a second volume of the inoperculate members of the same group. More detailed information regarding the work can be obtained by addressing The New York Botanical Garden, Bronx, New York City.

Professor John Harshberger of the Botanical Department of the University of Pennsylvania will visit Australia and New

Zealand this summer in order to enlarge his phytogeographical experiences and also to secure data on the plants introduced into Australia. He will also endeavor to study in their original habitats many of the Australian and New Zealand plants introduced into other parts of the world. Enroute short visits will be made to Hawaii, Samoa and Fiji. Photographs will be secured of the interesting vegetations of the countries visited and some collecting of plants done.

Secretary of Agriculture Arthur M. Hyde has appointed a committee from the Department of Agriculture to confer with the National Arboretum Advisory Council as required by the Act establishing the Arboretum. The members of the Departmental Committee are Dr. A. F. Woods, director of Scientific Work; Dr. W. A. Taylor, chief of the Bureau of Plant Industry; Major R. Y. Stuart, chief of the Forest Service; and Dr. F. V. Coville, and Dr. W. T. Swingle, of the Bureau of Plant Industry.

The National Arboretum, as authorized by Congress, will be developed on a large tract of land in the District of Columbia, including reclaimed land near the Anacostia River above the Benning Bridge. It will be both an educational and recreational center, and an important adjunct to the scientific activities of the Government, particularly the Department of Agriculture. To the fullest degree possible, it is expected the management of the National Arboretum will collect plants and trees from all the regions of the world for cultivation, study and breeding in the grounds of the Arboretum. Doctor Coville, one of the members of the Departmental Committee, has suggested the function of the Arboretum in such phrases as a "living library of the plants of the world," and as "a five foot shelf of the more important plants."

Four scientists of the Bureau of Plant Industry of the United States Department of Agriculture recently left for the Dutch East Indies.

Dr. F. V. Coville, principal botanist, and H. T. Edwards, senior technologist in fiber plant investigations, are delegates to the Fourth Pan-Pacific Science Congress to be held at Batavia and Bandoeng, Java, May 16–23, while Dr. R. D. Rands and George Arceneaux, specialists in sugar-cane diseases, will

attend the Third Congress of International Sugar-Cane Technologists at Soerabaja, Java, June 7-21.

En route from San Francisco, Doctor Coville will visit Japan to make some studies of acid soil plants, both fruit and ornamental sorts. This is a line of work to which he has given considerable attention in this country and which has resulted in notable improvements in the culture of such fruits as the blueberry and such ornamentals as rhododendrons and azaleas.

Mr. Edwards will visit the Philippines where he has spent many years in the study of abaca, maguay, and other long-fiber plants.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor, G. T. Hastings, 2587 Sedgwick Ave., New York when returning proof.

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(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 55, published in 1928, contained 562 pages of text and 15 full page plates. Price $4.00 per annum. For Europe, $4.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE —a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–55 can be supplied separately at $4.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (50 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–17 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **Index to American Botanical Literature**, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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Columbia University,
New York.

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EDITED FOR

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BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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THE TORREY BOTANICAL CLUB

OFFICERS FOR 1929

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All persons interested in botany are invited to join the Club. There are two classes of membership: *Sustaining*, at $15.00 a year, and *Annual* at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each Month at the American Museum of Natural History, New York City, and the third Wednesday at the New York Botanical Garden.

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Matter for publication, and books and papers for review, should be addressed to

GEORGE T. HASTINGS
2587 Sedgwick Ave.
New York City

TORREYA

Vol 29 No. 3

May-June, 1929

Cabbages and Cacti

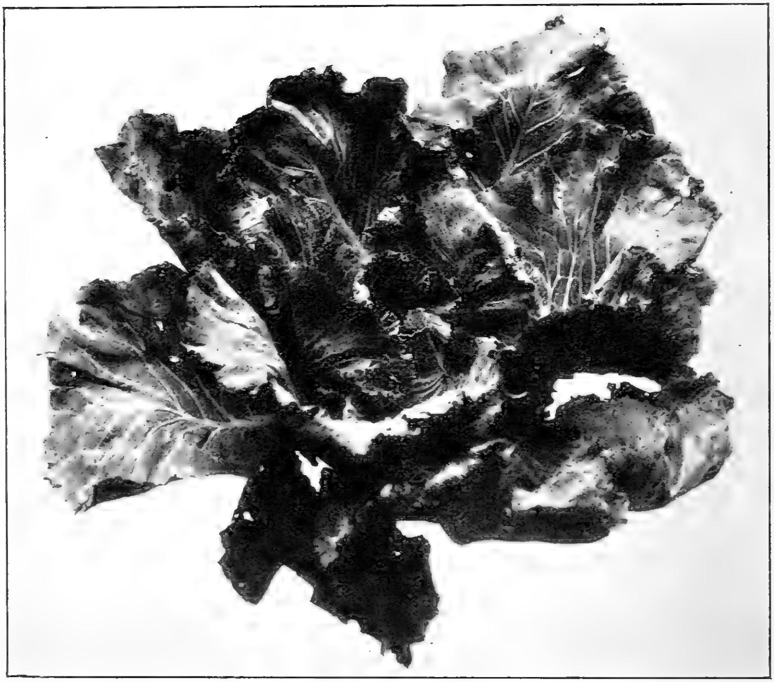
Ralph C. Benedict

The purpose of this short article is iconoclastic. The subjects of the title, cabbages and cacti, have little in common, botanically, but they do serve excellently, to illustrate a little stressed and often misunderstood biological principle, and may perhaps, also, furnish a basis for the correction of a widespread and rather popular myth.

Under cabbages are included all that congeries of vegetables which are botanically related, such as all the different types and colors of cabbage itself, cauliflower, broccoli, Brussels' sprouts, kale, kohl rabi, and the rest. Scientifically, these are all classi fied as belonging to a single species of mustard, *Brassica oleracea,* which in its wild form, is still found growing along the western part of Europe, as an inconspicuous, "poor relation" of this opulent vegetable group.

Probably, for most people, only two of the above list of cabbage types are familiar comestibles in the course of a year. For the purpose of somewhat better identification the following brief definitions are given. The cabbage itself represents a very much enlarged 'bud', the central fibrous conical structure being the stem. The cauliflower is a thickened abnormal branching flower cluster, something like the many-headed dandelion flowers which one occasionally finds. Broccoli, the favorite of the Italian, is similar to cauliflower, but differs in being green and much less condensed. Brussels sprouts are miniature cabbages, borne as lateral buds along an elongated stem, and sold by the quart. Kale and collards are types in which the leaves are thick and succulent, sometimes very much ruffled and curled but not overlapping to form a folded head or bud, like the cabbage. In kohl rabi the leaves are disregarded in favor of the spherically thickened stem, which may be called a sort of

stem turnip; in fact, the name, kohl rabi, is perhaps a corruption of its scientific name, *caula rapa*, which means "stem turnip". It is a matter of interest that the two common types of turnips, the white and rutabaga, are both related to the cabbage group, belonging as they do to separate species of the same genus, *Brassica*, as also do the several types of Chinese cabbage.



Fully grown plant of wild cabbage, raised from seed obtained from English sources. Note that it looks like a partially developed plant of the ordinary cabbage, from which it differs in the fact that it never "heads." Courtesy of Dr. J. C. Walker, Bureau of Plant Industry and the University of Wisconsin.

However, it should be noted that the assumed relationship between the cultivated forms themselves, and with the wild type are not based on any absolutely conclusive experimental evidence. They are believed to be related because of similarity of flower structure,—they all have the simple, four-petalled, yellow flower, so common among other mustard species,—and because of the close resemblance which young

seedling plants of the different types bear to each other. It should be added that this evidence is extremely convincing to those who are really acquainted with the actual facts involved.

Another very interesting indication of the close relation between these vegetable types is furnished by the fact that all of them are subject to the same kinds of diseases, although in different degrees. Dr. J. C. Walker (University of Wisconsin and Bureau of Plant Industry) in experimental tests of resistance to cabbage "yellows" (Jour. of Agric. Research *37:* 233–241, 1928) found that the wild type, together with varieties of broccoli and cauliflower, were highly immune, while kohl rabi and most varieties of regular cabbage were regularly susceptible, although in varying degree. The point is that the wild form does not differ in respect to "yellows" from the vegetable cabbage types, but is like some and different from others.

It is a fact, nonetheless, that all the principal types of this cabbage tribe have been known and used for the last two thousand years, and probably longer. Their production cannot be ascribed to the work of any modern "plant wizard," to use that misrepresentative and over-worked appellation of the newspaper headline writer. If their original production was the work of any particular horticulturists, apparently publicity was not so well handled in those days. No names have come down in history.

This group of plants, therefore, illustrates a principle which is often overlooked in these days of emphasis on the new discoveries of science, important as these are. With respect to these cabbage types and also with reference to most types of cultivated plants and animals, it is probably safe to say that at least eighty percent of the distinct and desirable varieties represent old forms, selected and perpetuated since before the rise of modern genetics.

We believe that in the principles of Mendelian heredity, we have found the key to incalculable progress in future breeding, and it may well be that fifty years hence, the new kinds of cultivated plants may be so extensive and revolutionary as practically to replace most of our current forms. However the progress which has been made during the last fifty years in producing important changes among cultivated plants is but a

small fraction of the differentiation which had been achieved in pre-scientific days, much of it, as with the cabbage group, in pre-historic times.

How did these old varieties come into existence? What can we guess as to the probable basis for their original selection and preservation? In the case of the cabbage group, it seems reasonable to suppose that some primitive food-gatherer, out collecting the daily supply of vitamines for her family, chanced upon a plant of this wild mustard type which made better "greens" than the common run of the species. Presumably such a better type must have been noted sometime, and preserved for later artificial propagation.

What caused the new type? The same cause that has underlain the production and discovery of most kinds of cultivated things,—chance variation, or as it is also called, spontaneous mutation. There could hardly have been any purposive hybridizing back of it, for it is only relatively recently that hybridizing has entered into the common practice of plant breeders in general. Most new varieties have arisen by unexpected and unpredicted variation, just as in the case of the commercial Boston Fern, from which hundreds of distinct new forms have appeared during the last thirty-five years.

With regard to the cactus, spineless types of which have received a great amount of newspaper publicity during the past twenty-five years, it seems to be true also that the best varieties are old, antedating any definite records of their producer. Professor Thornber, of the University of Arizona, some years ago, made a careful experimental cultural test of as many different kinds of spineless cacti as could be obtained, and found that the best and most vigorous grower in his section of Arizona was not any recently advertised commercial variety, but a Mexican Indian type which had been cultivated since before Columbus, at least.

Again contrary to general belief, he found that for cattle forage purposes, the spineless varieties which had strongly been promoted as holding great promise for the extension of cattle raising in the dry Southwest, were practically useless. The reason for this is simple. It was found that even the old Indian variety could not be grown on the open range, because the cattle would browse it so close as to kill it, if they got the

chance. Even to grow it experimentally required expensive fencing to keep the gophers and jack rabbits away, as these rodents would destroy any unprotected succulent. It is obvious, therefore, that spineless cacti cannot be economically grown if they must be protected by rabbit-proof fencing.

Paradoxically, also, Professor Thornber found that the best kinds of cactus for cattle food were the spiniest types of prickly pear and cholla, simply because neither rabbit nor even a jackass could eat them. The explanation of this apparently contradictory state of affairs is found in the fact that these spiny

Spiny cacti as cattle forage. The picture shows a man operating a gasoline singeing apparatus, to burn off the sharp spines, while cattle are following along, and browsing from the treated plants. Courtesy of Dr. David Griffiths, Bureau of Plant Industry.

kinds can be made available for cow fodder by an inexpensive process of singeing in which a specially constructed gasoline torch is used to burn off the protective armature. They may also be prepared by cutting off whole branches and then chopping these up in cutting machines. It was a final conclusion of the Thornber experiments that the cultivation of cacti for cattle forage deserved extension and promotion, although by itself, cactus material is an incomplete ration, and requires to be fed in conjunction with supplementary foods.

In a somewhat later experimental study, Dr. D. W. Griffith of the U. S. Department of Agriculture, carried on extensive culture of various species of possible forage cacti in Mexico. In general, his findings were in agreement with those of Professor Thornber, but the best species for Texas were still different from those found desirable in Arizona, the best spineless type being a variety developed in Italy where it is grown for fruit.

Finally, will it not be agreed, that while it is unpleasant to have rocks thrown at one's pet idols, or doubts cast at one's favorite fairy stories and myths, there are still plenty left, and there is also satisfaction, though of a different kind, in feeling the advent of a little more maturity?

Brooklyn Botanic Garden
Brooklyn, N. Y.

The Bosque at Pará

Norman Taylor

Brooklyn Botanic Garden

This city of two hundred thousand people who live almost on the equator, has been quite literally rescued from the jungle. The edge of the greatest rain-forest in the world still crowds in upon the edge of the town where a man may step outside his house into a hot steaming forest. Not in Rio de Janeiro, nor Bahia nor in Pernambuco is there this feeling that the forest all but submerges man's efforts to hold it in check, for the outskirts of these large Brazilian cities are fringed with immense plantations of cotton, tobacco, sugar, rice and cocoa.

But Pará is very different. Once the capital of the rubber world, and still the greatest seaport for Brazil-nuts, timber, many oils and resins, and the relic of the rubber debacle, its growth and prosperity were and are based upon the natural products of the Amazon. None, but guaraná and a trifling amount of cocoa, both native farther up the valley, are cultivated. And men's minds, in the old days were centered upon the vast wealth of the Amazonian forests, so that once the city was established little effort was made at agriculture and the forest was allowed to creep back to the very door yards of Pará.

Many years ago, long before the English took *Hevea brasiliensis* to the East where now ten times the amount of rubber is produced than comes from the wild trees of the Amazon, Pará set aside a square kilometer of its jungle as a public park,— The Bosque. All that was done now stands as a monument to the foresight of its creator, and a relic of the prosperity that may years hence come to Pará again. Fences, benches, an arbor or two and a few bridges, all of wood, are now in active decay. Algæ and mosses cover some of them, and fungi and constant moisture and insects will soon make an end of such structures as remain.

While this decay may be deplorable from the point of view of park management, the Bosque remains one of the most interesting parks in the world. Not a plant is labelled, but nowhere in Brazil can the ordinary visitor see tropical vegetation so easily. Getting through the virgin forest is a task requiring tremendous effort, and must be based upon relative

indifference to insects and sometimes the attentions of more formidable fauna. In the Bosque there is almost complete freedom from most of these discomforts and, of course perfect freedom from snakes.

Asiatic bamboo, one of the few exotic plants in the Bosque at Pará.

A series of irregular trails leads to all parts of the Bosque, but there are no wide roads through it which would destroy

the conditions of shade and moisture upon which the maintenance of the forest depends. Along a few of these trails a handful of exotics have been planted, mostly *Chrysalidocarpus lutescens*, various species of *Pandanus*, a *Codiaeum* or two, here and there the noble royal palm, and Asiatic bamboos. But the great bulk of the area is exactly what the conservationists pine for,—a piece of wild vegetation rescued from the wild and let alone.

As in the jungle the first thing that strikes one is the enormous number of species and the rarity of the trees, at least, that occcur in any very definite stands. Easily the dominant tree is the sumauma as the Brazilians call the silk cotton tree (*Ceiba pentandra*). Dominant as to numbers it is also the tallest and largest tree in the Bosque. Some specimens have the immense flanking buttresses, spreading 15-20 feet away from the trunk proper, and extending upwards so high that the clear bole of the tree is not reached until 20 feet from the ground. In the coves made by these buttresses there is an accumulation of humus and half rotten leaves often three to four feet deep, usually crowned by a mass of ferns, Marantaceae, *Selaginella*, and often a few low shrubs of the Melastomaceae with showy pink flowers. With the coves large enough to stable a horse, sometimes a team of them, the tree appears to rise from a great heaping mound of verdure separated by these buttresses, which may extend a long way from the trunk but are usually less than six inches thick, and often only three inches.

The sumaumas, and several other Bombacaceae, together with trees of the Lauraceae Fabaceae, Caesalpiniaceae Caryocaraceae, and perhaps a dozen others make up the topmost tier of the forest canopy. For this forest has two and sometimes three recognizable tiers, a characteristic of the Amazonian rain-forest often noted by Warming, Huber and others. Far up in the uppermost tier are epiphytic aroids, appearing through the binoculars as of the *Dieffenbachia*, *Anthurium* and *Philodendron* type. But enormously greater in numbers of individuals and species are the Bromeliaceae, some of them with showy scarlet and yellow spikes often two or three feet long. Less common are orchids none of which were in flower at this season (January), and no epiphytic cacti of the *Rhipsalis* type appear to be here, perhaps because the forest is so constantly moist. Just how wet

it is may be gleaned from the fact that thrice in the few hours I spent in the Bosque, torrential rains have driven me under one of the thatched arbors, under which most of this has

Sumauma (*Ceiba pentandra*), one of the largest trees in the forest near Pará. A cultivated specimen at the Museu Goeldi, Pará attained a girth of 14 feet in 32 years.

been written to the accompaniment of the roar of the rain and the bombardment of heavy fruits that the wind and rain keep pelting down on the roof.

Among the other epiphytes are many species of Piperaceae, some of the genus *Peperomia* having showy variegated foliage. And one or two Marantaceae seem to be sometimes climbing from the ground and again truly epiphytic. Of course, as to numbers of individuals, the epiphytic flora is easily dominated by filmy ferus, *Selaginella*, and tremendous patches of mosses, so that these cryptogams clothe with green the lower, darker and moister part of tree trunks whose bark is otherwise as smooth and often as light as a young white oak.

This upper and lower stratification of epiphytes seem to be clear reflection of the light and moisture differences between the canopy and the forest floor. The light-demanding and relatively drought-resistant bromeliads and orchids are mostly all up near the canopy, while the moisture-demanding and highly tolerant (in the forestry sense) cryptogams are practically confined to the atmospheric layer on or near the forest floor.

The moisture conditions on this forest floor are, in the absence of instrumental verification, impossible to state. A layer of leaves and humus of unknown depth, but apparently at least two feet thick, soak up the rain, more than half the total yearly amount of which falls during the period of January to May. Not in a steady fall, but in torrential downpours, often six or eight of such occurring in a few hours. These are punctuated by perfectly still periods of sunshine, or of moist almost fog-like cloudiness, and it is during these intervals that the lower strata of the forest seem to reek of warm steaming vapors.

In such an atmosphere vegetation luxuriates, and man, at least at Pará does not seem to suffer much, for the death rate here has not been more than five to the thousand greater than New York during the last twenty years, when malaria and yellow fever were checked.* The conditions in the real jungle are very much the same, but, of course, the incidence of malaria is much greater while yellow fever is all but unknown there, as it appears to be one of the benefits of civilization.

The forest is hung and festooned with lianes. Weird tales have been written of these curious growths of a tropical forest, some of the more gifted of the writers having endowed them

* Since writing this there has been an outbreak of yellow fever at Pará.

with man-hunting proclivities of a deadly variety. The nonsense of such statements may perhaps be explained by the fact that at least some of the stories have been written by poor, fever-

Epiphytes in the Bosque at Pará, mostly ferns, aroids, melastomads bromeliads, gesneriads and *Selaginella*.

stricken wretches who ascribed to these innocent climbers not their true function but the impression they made upon the mind of one in no condition to judge. These great woody streamers,

often hanging from the topmost canopy to the ground, some thin as a whip cord, others as thick as a man's body, are a feature of the rain-forest that inspires wonder, and actually they enormously increase the difficulty of getting about. Some of them of the family Clusiaceae and of the Genus *Ficus* are wrapped about the trunks of trees, first in an ineffective rope-like coil, but later in huge tendon-like growths that often strangle their support. Trees in all stages of this strangulation are to be found and sometimes the stranglers are themselves strangled by a new comer. It is small wonder that such vegetatively deadly propensities should have been extended into the idea that lianes were man hunters, The legend still persists here in the minds of those tuned to the miraculous.

The lianes, the density of the forest, the tremendous amount of moisture, the epiphytes, the insects and birds and monkeys that are everywhere,—the over-powering sense of teeming life,—these and the color and gloom of the jungle make of the Amazonian forest a place quite marvellous enough, without the horrors of the imaginative nature fakir. The city of Pará, with quite extraordinary foresight, has captured a bit of that life, preserved it nearly intact, so that the Bosque will always be a place of peculiar interest to visitors.

PARÁ, BRAZIL
JANUARY 6, 1929.

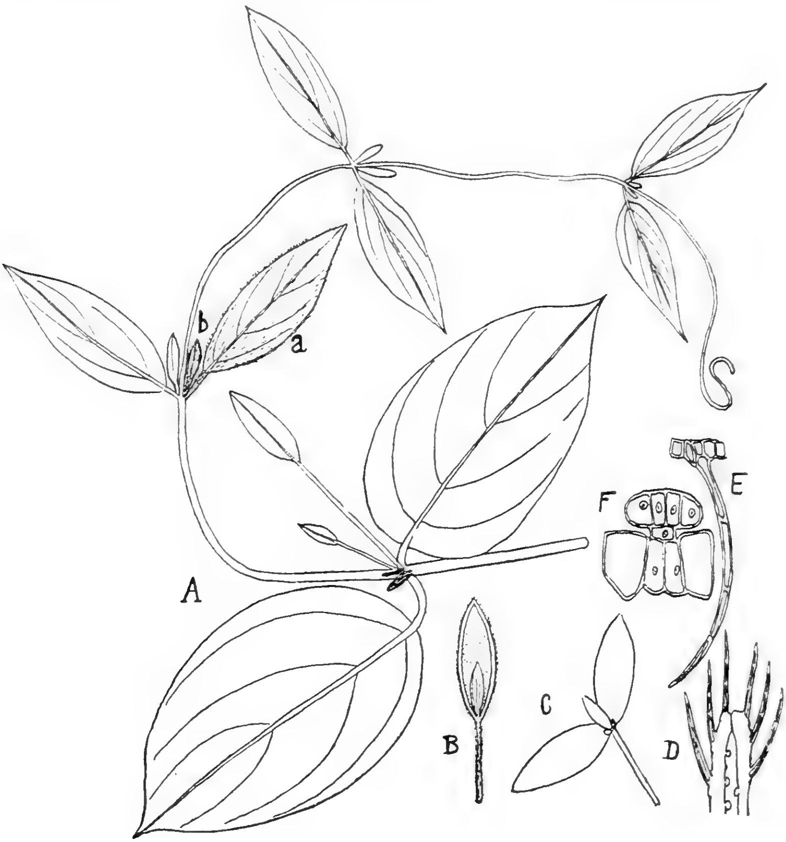
The Water-Storing Bracts of Mendoncia coccinea Vell. of Brazil

John W. Harshberger

Mendoncia is a genus of the family *Acanthaceae*, the twenty species of which are found in tropical America principally in Brazil, Guiana, Peru and an outlying species, *M. costaricana* Oerst. in Costa Rica. The plants of the genus are shrubs, or vines, usually well-provided with a hairy covering. The simple leaves are opposite and the floral bracts are likewise with their edges adherent. Each pair of opposite bracts usually encloses a single flower, while a few supernumerary buds remain of small size at the base of each flower. The flowers are trumpet-shaped with a calyx of reduced size and a corolla of five spreading petals inclosing four stamens. The fruit is drupe-like with fleshy pericarp and one to two seeds.

Mendoncia coccinea Vell., collected by the writer at Paineiras in the tropical forest on the mountain of the Corcovado near Rio de Janeiro, Brazil, at about 608 meters (2,000 feet) on July 18, 1927, is a woody vine. The velvety, twining stems are provided with opposite, ovate, simple leaves, velvety pubescent on the lower and upper surfaces, 40 mm. broad and 65 mm. long and with short, pubescent petioles, 6–8 mm. long. (Fig. A) The velvety peduncles of the flower arise from the axils of the foliage leaves and are about 30 mm. long surrounded by the opposite bracts, which are about 20 mm. long and 8 mm. wide. This pair of bracts is tightly closed together, like a bivalved clam, or oyster, and thus protect the small red flower bud. (Fig. B. C.) Each bract is papillate inside with numerous low multicellular capitate hairs that conform to the type of secretory hairs. (Fig. D.F.) In this case they secrete the water which accumulates in the space between the tightly adherent bracts, (Fig. B) whose margins and external surfaces are covered with straight, or slightly bent, several-celled hairs. (Fig. D. E.) These hairs form an external felt-like covering which prevents the loss of the water of internal secretion, which keeps the flower buds moist and prevents desiccation until the bracts separate and the flower buds are fully blown. The figures accompanying this short account of an interesting tropical liane display the general morphology of the plant, and the microscopic structure of the hairs which are of importance in pro-

viding the water in which the floral buds are bathed, and which conserve that water after it is once secreted. (Fig. D. E. F.) We have in this species an exemplification of adaptations of



Mendoncia coccinea Vell. *A*. Whole plant; *a*, a velvety leaf to show character of covering; *b*, adherent velvety bracts enclosing flower bud: *B*. Vertical section of bracts enclosing flower bud surrounded by water: *C*. Widely spread bracts and flower bud: *D*. Apices of two adherent bracts with hairs: *E*. Hair from outer surface of bract: *F*. Glandular hair which secretes water from inner surface of bract.

means to an end. One surface of the floral bracts is secretory, the other surface is protective. The foliar bracts by sticking closely together form a reservoir of free water in which the

flower buds are immersed until the flower opens ready for pollination. There are various ways in which plants store water. The arrangement of bracts in *Mendoncia coccinea* is a simple, but effective, means of water storage in a tropical liane, which reaches up into the forest trees where desiccation is more likely to occur than lower down, where the dense shade and nearness to the soil creates an atmosphere more nearly saturated with moisture. Shreve has referred to this fact in his study of the distribution of the bromeliads up and down tropical trees in the rain forest of the Blue Mountains of Jamaica. The more xerophytic bromeliads are found near the tops of the trees. The less xerophytic ones grow below.

University of Pennsylvania

The Relation of Cladonia Mats to Soil Moisture

Cedric L. Porter and Marjorie L. Woollett

During the course of study of the establishment of seedlings in cladonia and moss mats, data on soil moisture were obtained thru the summer of 1927. The areas under observation are located in the northern end of the southern peninsula of Michigan near the University of Michigan Biological Station. The soil is glacial sand. The areas were originally covered by a dense forest of white and Norway pines, *Pinus strobus* and *Pinus resinosa*. Following lumbering and repeated fires, they are now overgrown with aspens dominated by *Populus grandidentata* and bracken fern, *Pteris aquilina*. Where gaps appear in the vegetation, the soil is loose and sandy. In many such places large beds of almost pure *Cladonia rangiferina* are frequently found. These, for the most part, occupy open places nearly or quite unshaded by the surrounding trees. Seeds of herbaceous and woody plants are available in abundance, but seedlings usually fail to become established in Cladonia beds. The moisture content of open surface soil is very low. Often no moisture may be detected. The summer of 1927 was quite ordinary with but one short period of high temperature and the usual succession of fair, dry weather and light rainy days. There were no thoroughly dry periods, consequently the soil moisture during this year was reasonably favorable for the establishment of seedlings, yet the establishment as usual did not follow.

The soil moisture was determined by the alcohol method of Bouyoucos* which briefly is a mixing of the soil with alcohol of known water content according to a definite plan and ascertaining by a hydrometer the water content of the alcohol after the mixing and multiplying by the factor which experience has shown proper. The samples were taken at the beginning and during rain storms to show particularly the effect of the *Cladonia* mat upon the soil moisture beneath it. Samples were often taken at short intervals during the course of the rain storm.

* Bouyoucos, G. J. Rapid determination of soil moisture by alcohol. Science, 65: 375, 1927.

DISCUSSION

It can be readily seen from the table that a cover of Cladonia prevented as rapid an absorption of rain by the soil as was possible in open areas. The rain falling upon the mat was absorbed by the lichen cover which swelled and held as much as $4\frac{1}{2}$ times its own dry weight before allowing moisture to pass freely to the soil beneath. In one case 16 grams of dry Cladonia weighed 73.5 grams when wet. When the rain was short and

TABLE I

	Bed No.	Soil Moisture		Notes
		Open	Cladonia	
		Per cent	Per cent	
July 5	1	5.35	1.78	Light rain (2 hours)
	2	5.35	1.78	
July 6 (A.M.)	1	8.92	6.07	Light rain (12 hours)
	2	8.16	5.35	1.41 cm
July 6 (P.M.)				
7:25			5.35	Light rain .96 cm.
7:35			5.35	
7:45 (peak)			8.92	
7:55		16.78	7.14	
July 26 (Before rain)			1.78	Light rain
(After rain)			1.78	.41 cm.
July 30*			42.84	Between rains Big Stone Bay
Aug. 8		0	0.36	Dry spell
Aug. 9		0	0.71	Dry spell

* This area is subject to moisture and wind from Lake Michigan.

light, no moisture at all reached the soil. From the figures given in the table, 2.26 times as much moisture was found on the average in the open areas as under Cladonia mats after rains. This prevention of the rain from reaching the soil easily explained the drying up of the seedlings which germinated beneath the Cladonia and of those which germinated within the Cladonia and became rooted in the soil beneath.

On the other hand, it is true that the Cladonia tends to hold whatever moisture there is present in the soil for a longer time than the moisture remains in a similar but open soil. The average amount of moisture found in the surface soil under the lichen cover was under 1 % during dry spells, while in open areas

there was none present at all. And so, altho the Cladonia prevented as rapid evaporation from the soil, the slightly greater amount present under it was not sufficient to counterbalance the greater hindrance to the repletion of water content during light rains and dews on account of the absorption by Cladonia.

SUMMARY

A study of moisture content in open areas and under Cladonia mats in Cheboygan County, Michigan, during the summer of 1927 (an ordinary summer) supplies figures which show that the soil under the Cladonia mat contains more moisture during dry periods, but does not receive as much moisture from rain and dew as the open.

Cladonia may absorb as much as 4.5 times its weight in water before allowing moisture to pass to the soil beneath.

UNIVERSITY OF MICHIGAN BIOLOGICAL STATION,
CHEBOYGAN, MICH.

Epidendrum conopseum, Ait. in Louisiana

H. M. DENSLOW

The note in Torreya concerning the finding of this species in Louisiana is interesting but not quite accurate. It was collected in Plaquemine Parish in February and in August 1915 by Miss Eunice Treuil. I have specimens in my herbarium. This Epidendrum had been collected by B. F. Bush at White Castle, Louisiana, July 30, 1897. There is a specimen of this collection, No. 347, in the Herbarium of the New York Botanical Garden. It may be expected in other places in Louisiana. White Castle and Plaquemine are about ten miles apart and not far from Baton Rouge. West Feliciana Parish, from which Miss Koch sends this report, is about forty miles northward and to the east of the Mississippi River.

These collections at long intervals and in three localities emphasize the fact that species may be unknown, at least as to their distribution, because we do not search for them.

CHELSEA SQUARE,
NEW YORK CITY.

Only New Jersey Stand of Sibbaldiopsis Tridentata Destroyed

The only occurrence of *Sibbaldiopsis* (*Potentilla*) *tridentata*, the Three Toothed Cinquefoil, in the State of New Jersey, seems likely to be entirely obliterated, by the construction of a monument to the soldiers and sailors of New Jersey, on the summit of High Point, on Kittatiny Mountain. This sturdy alpine-arctic plant, which is to me closely associated in the mind's eye of memory, with high summits all along the Appalachian Ranges, from Mount Katahdin, Maine, to Mount Pisgah, in North Carolina, formerly flourished in a space perhaps 200 feet square, on the summit of High Point, the highest place in New Jersey, at an elevation of 1825 feet above sea. So far as I know it was the only occurrence of the plant between the Taconics at the New York-Massachusetts-Connecticut corner, and the higher summits of the Blue Ridge in northern Virginia, above 4,000 feet, in the area of the proposed Shenandoah National Park, with the exception of a small stand covering only a few square yards, on the summit of Mount Beacon, in the Highlands of the Hudson, opposite Newburgh, N. Y., at an elevation of 1640 feet.

I recall enjoying the sight of the plant, in bloom, several years ago, before High Point became a park and while it was still part of the estate of the late Col. Anthony R. Kuser, who gave his estate, in 1923, to New Jersey. In his will, filed since his death a few months ago, Col. Kuser bequeathed $50,000 to erect a sort of Bunker Hill monument, 200 feet high, as a war memorial on the summit of the Point. I was there on April 27, and found the summit covered with blocks of light gray Vermont granite, which are to rise in the tower above the reddish gray Devonian sandstones and conglomerates of the ridge. A fifty foot square base of concrete, heaps of blasted rock, water tanks, construction sheds, etc, covered all of the area where Sibbaldiopsis once grew and I could not find a single plant remaining. Possibly some may survive after the work is done and the debris of construction cleared, but it seems unlikely. Of course there is plenty of the species on New England summits but as this was the only stand of the plant in New Jersey, it seems unfortunate, from the point of view of that portion of the public including botanists, that one of them was not at

hand to plead for the conservation of Sibbaldiopsis, which to my mind, was one of the most interesting features of the vegetation of the summit. Quite likely the Kuser family would have given consideration to the matter, if they had been asked, but I am afraid it is too late now.

RAYMOND H. TORREY

BOOK REVIEW

Trees and Shrubs of Minnesota[1]

This very attractive volume describes all the trees and shrubs known as native or naturalized in Minnesota and in addition those frequently cultivated in parks and gardens. While written primarily for those whose interest in plants is general rather than technical, it is interesting to note that the authors have not tried to write down to their public, but expect the public to show enough interest to read the introduction, learn a very few botanical terms, and accept accurate descriptions and careful discrimination between species. A good glossary makes this easy for those with no botanical training. The nomenclature follows the International Code as revised by the Brussels Congress of 1910. Synonyms are given where other names are used in familiar manuals.

There is a key to families based on strictly botanical characters, chiefly of the flower, a key to genera based on leaf and stem characters and, under the genera, keys to the species. The descriptions are clear and complete, including botanical characteristics, ranges and habitats, notes on growth, uses or other items of interest. The book is well illustrated with line drawings of fruit and flowers and numerous half tones of whole trees or shrubs or of branches. (A rather amusing error is in using the cut of *Rubus parviflorus* correctly on the jacket but inverted in the text.) The book is well bound, printed on good quality paper with a complete index. It should prove of real value not only to residents of Minnesota but to those in neighboring states.

GEORGE T. HASTINGS

[1] Trees and Shrubs of Minnesota, Carl Rosendale and Frederic K. Butters, University of Minnesota Press, Minneapolis, Minn. Pages vii+385, $4.00.

Field Trip of the Torrey Botanical Club, Sunday, April 21, 1929. Nineteen members of the club and friends met at the Dyckman Street Ferry for a trip along the Palisades, in spite of threats of rain. The threat was fulfilled with a few showers which culminated in a steady rain about the time the party started for home.

Along the slopes above the path many spring flowers were found:—rue anemone, blood root, dutchmans' breeches, wild strawberry and chickweed. The common horsetail, *Equisetum arvense*, was abundant, the fertile stems all withered, having shed their spores, and in one place a quantity of the winter horsetail, *Equisetum hyemale*, the stems, some of them over three feet long, all of the previous summer. Cherry trees, mostly relics of the time when homes were scattered on the occasional level spaces below the Palisades, were in blossom, as were the forsythia, Japanese barberry and Japanese quince. Here and there small peach trees were masses of pink, these apparently sprung from stones thrown away by picnickers.

Lunch was eaten below Buttermilk Falls. Against the sides of the cliff several shrubs of shad bush were in bloom. After a short time spent in studying rocks, the party climbed to the top along a long disused road. After wandering through the oak woods the party walked around the depression known as the Keldars. Along the sides of the swamp that fills the Keldars and by the brook which makes the falls, below which lunch had been eaten, spring beauties and dogtooth violets were in blossom, though nodding their heads and half closed because of the lack of sunshine. A few blue violets and one patch of white were found in the damp ground and some of the downy yellow violet in the drier woods. The unfolding plicate leaves of the white hellebore were in sharp contrast with the half developed skunk cabbage. Cinnamon, interrupted and royal ferns were found unrolling their fronds. In the water were several clumps of golden club, *Orontium aquaticum*, the yellow spikes of flowers showing for an inch and a half or two inches above the water. This was the only uncommon flower found. In the swamp of the Keldars the heart-leaved willow were in blossom, both the staminate and pistillate.

The members of the party also enjoyed the abundant bird

life. One little apple tree whose buds were just showing a bit of pink was alive with kinglets, ruby and golden crowned, busy hunting insects. It was interesting to see them poise in front of a half opened leaf bud on fluttering wings like a humming bird to probe for insects hidden there. With the kinglets were several myrtle warblers. The hermit thrushes were everywhere, sometimes singly, more often in pairs or in small flocks of six or seven.

Under two widely separated sugar maples the ground was found covered with small twigs with the flower clusters and opening leaf buds. These were apparently bitten off by squirrels. Possibly there was still enough sugar in the sap to make the squirrels prefer these to other twigs as nothing of the sort was found under other trees.

GEORGE T. HASTINGS, *Leader*

Field Trip of May 18

On the trip to the Moravian Cemetary on Staten Island many native flowers and trees were observed, a number of ferns were found and some time was spent observing birds. A list of some thirty flowers was made, including four violets, the lance-leaved, the common blue, the bird's-foot and the arrow-leaved. Fourteen species of ferns,—the three Osmundas, the sensitive, Virginia grape, brittle, Christmas, New York, broad beech, ebony spleenwort, silvery spleenwort, lady and maiden hair. Forty species of birds were seen including the cardinal and the following warblers,—black-and-white, parula, worm-eating, blue-winged, golden-winged, yellow, black-throated blue, myrtle, magnolia, chestnut-sided, blackburnian, black-poll, Canadian, oven-bird, Maryland yellow throat, and redstart.

FARIDA A. WILEY, *Leader*

Field Trip of May 19

Two Plants in Conditions of Difficulty

Two plants, the Walking Fern, *Camptosorus rhizophyllus*, and the Prickly Pear Cactus, *Opuntia vulgaris*, existing under conditions in which they do not seem at their happiest, and where their persistence seems precarious, were the chief objectives of

a field excursion enjoyed jointly by the Torrey Botanical Club, and the New York Chapter of the Appalachian Mountain Club, and also by members of the New York Microscopical Society and the New York Bird and Tree Club, on Sunday, May 19. The route was from Riverdale, N. J., on the Greenwood Lake division of the Erie Railroad, to Pompton Lake, up Firey Brook to Pine Lake, a new artificial water body, and along the basalt ridge which connects Packanack and Preakness Mountains. It was intended to go to Franklin Notch, but a heavy thunderstorm which drenched everyone, drove the party out early to Upper Preakness, to take bus to Paterson and New York. Sixteen were present, ten women and six men.

The first of these plants in unusual conditions to be examined was the Walking Fern, in the only occurrence of the plant in northeastern New Jersey, on the walls of the gorge of Firey Brook, about a quarter of a mile east of Pompton Lake, and about 200 yards below the dam impounding Pine Lake. This is a very interesting gorge. Its upper walls show normal Triassic Newark sandstone, mostly in massive strata, with some thin-bedded shaly streaks. At the bottom, a few feet above the brook, is exposed a peculiar conglomerate, with a matrix of Newark sandstone, inclosing pebbles, up to the size of an apple, of three kinds of rock, Newark sandstone, basalt of the same age, and limestone of probable Silurian age. The limestone is attributed to beds of such material, laid down in marine waters east of the Archean granites and gneisses of the Ramapo mountains, which dropped thousands of feet in the disturbance which included the famous Logan Line fault, at the end of the Triassic period, or early in the Cretaceous. The beds dropped out of present sight, but the conglomerate including pebbles worn from them, by atmospheric weathering and assembled in some sea beach or erosion fan, was apparently unaffected by the disturbance, except that it presents the same inclination shown in all of the Triassic sandstones, toward the west, in the direction of the great fault line bordering the old rocks.

The presence of these limestone pebbles, which make up not more than twenty per cent, probably less, of the content of the conglomerate, evidently provided the calcium usually preferred by the Walking Fern. That there is scarcely enough lime in the rock for the Fern to be happy is indicated by its

stunted condition. The fronds are not half the normal size of those I have found on ledges of high lime content in the Wallkill Valley, or on the Mississippi river cliffs in Iowa, or in the Harlem valley in Putman and Dutchess counties. With it is much maidenhair spleenwort, more healthy in appearance; evidently this species can prosper with much less lime. I have seen Walking Fern on a limestone boulder, of high calcium content, a glacial erratic on granite, in Sussex County, N. J., which was perfectly normal, though ten miles away from the nearest ledges of such rock. The wonder in both cases is at the establishment of the Walking Fern in the first place, so far from its usual haunts.

The other plant, the Prickly Pear Cactus, was found on thin soil covering the basalt of Preakness Mountain, a mile northeast of Pine Lake. Various evidences pointed to the certainty that the ridge was once in open pasture. The red cedars were dying from the increasing shade of oaks and other hardwoods which were re-establishing themselves. *Phlox subulata*, which usually prefers the sun, persisted, in thin unthrifty stands in this shade. Prickly Pear is not rare in northeastern New Jersey and the Lower Hudson Valley; I know a dozen stands of it, but it always seems strange to see a plant which one associates with the arid Southwest in our northeastern hardwood and mixed forest areas. I believe the accepted explanation is that the cactus and probably other plants of arid climes migrated north after the close of the last Glacial Period, during a time of low rainfall, as indicated by aeloian deposits in the Mississippi valley and other evidence; and that since the climate has become more humid, the plant has retreated to dry, sandy places, such as Nantucket Island, eastern Long Island and southern New Jersey, and to lofty, rocky, almost bare hilltops, or similar situations.

The small colony of Prickly Pear which we found on Preakness Mountain was no more happy than the lime-starved Walking Fern; it was not spreading, showed no blossom buds, and some of its fleshy branches were withering. Evidently the shade, increasing yearly since the last cutting, or since the ridge was in pasture, is gradually killing it out. Its tenure in this locality seems likely to be short. I have seen two or three other small stands on this ridge, and only one, on a dry open ledge, was observed to bear blooms and fruit.

The party was pleased to find several colonies of Purple Lady's Slipper, in good bloom, evidently escaped from danger of ruthless plucking because off the common trails. *Azalea nudiflorum* was increasing and many splendidly blooming clumps were seen. *Saxifraga pennsylvanica* in a little bog was a plant new to some. The puzzling early leaves of *Aster cordifolius* and *variegata* were interesting; one is hardly sure, in May, what they are. False miterwort, not common in northern New Jersey, was found in the Firey Brook gorge. Those in the party interested in birds found the scarlet tanager most numerous or at least most vocal. An oddity was the growing together, rolled within each other, in their upper portions, of three large leaves of the skunk cabbage, evidently from failure to separate in the budding stage.

RAYMOND H. TORREY. *Leader*

PROCEEDINGS OF THE CLUB

Meeting of February 5, 1929

This meeting was held at the American Museum of Natural History with forty three members present. President Denslow called the meeting to order at 8 P. M.

The following new members were elected:

Mr. Edmund H. Fulling, 205 White Plains Road, Tuckahoe, New York; Dr. E. E. Dale, Hunter College, 145 East 32nd Street, New York City; Miss Rebecca Feinberg, 1225 Eastern Parkway, Brooklyn, New York; Mrs. Wm. Gavin Taylor, The Beechmont, Arlington, New Jersey; Miss Ruth M. Patrick, Coker College, Hartsville, South Carolina.

Mr. Austin F. Hawes, State Forester of Connecticut gave an illustrated lecture on "Our National Parks and Forests," telling of the purposes of each, their management, and their great recreational advantages as well as their importance in the conservation of wild life. This was admirably illustrated by a large number of lantern slides.

After the lecture, the meeting was adjourned to refreshments of coffee and cake, provided by the entertainment committee, served in the hall of flying birds of the Museum, by Mrs. G. T. Hastings.

Forman T. McLean, *Secretary*

Meeting of February 20

This meeting was held at The New York Botanical Garden with sixteen members present. Minutes of the meetings of January 16th, and of February 5th, were read and approved.

The following new members were proposed and unanimously elected:

Mr. Albert C. Smith, Mr. George E. Brownell, Mr. J. H. Parker, and Miss Dora Elpern.

The resignations of Mr. Abraham Schur and Miss Mary E. Wood were accepted with regret.

Mrs Wanda K. Farr of the Boyce Thompson Institute spoke on "Studies on the Growth of Root Hairs in Solutions."

The choice of experimental material for studies in cell-enlargement is not at all simple. An aquatic form in which

single cells are visible and easily manipulated is preferable because of the ability to obtain more constant nutrient conditions. If successive measurements are to be made over a period of time, it is also desirable that the cells be stationary. It is almost necessary that the enlargement take place in only one direction so that the increments may represent as nearly as possible the absolute growth during the period of observation. It is also a matter of decided advantage that large numbers of cells may be located in a field of the microscope so that their increases in size may be measured simultaneously. One must certainly have an abundance of material of the same physiological age.

The root hairs of many terrestrial plants would seem to possess all of these requirements. Seedlings may, in many cases be produced within a moist chamber within a short period of time, furnishing an almost unlimited amount of material. The seedlings of many kinds of plants will continue to form root hairs when they are transferred to a nutrient culture solution.

ORIGIN OF ROOT HAIRS

Each root hair is an extension of a single epidermal cell which is subject to neither division nor marked differentiation throughout its normal development. The usual direction of growth is in a line perpendicular to the main axis of the root.

Even a brief resume of the various theories concerning the development and function of root hairs would require more time than is available. If I may summarize, with no sense of finality, the following points may serve to present the ideas now considered to be most tenable. From the experiments of Reinhardt in which he placed minute particles of red lead upon the tip of the root hair and watched the change of position as the hair grew, we may believe that some root hairs grow at the tip. That this method of growth is not universal, however, has been shown more recently by Ziegenspek. He has found that in Hydrochairs the growth takes place intercalarly near the base of the hair.

COMPOSITION OF THE ROOT HAIR WALL

Studies of the nature of the cell wall have produced a large amount of conflicting evidence. From the behavior of the hairs

in bursting almost invariably at the tip, and from microchemical studies, however, we may conclude, in general, that the material at the tip differs with that along the sides of the hair. The tip wall substance is probably amyloid in nature, the side wall calcium pectate, while real cellulose may be found at the base of the hair. According to Ziegenspek, Hydrocharis again reverses the picture by depositing the amyloid substance at the base, but this is entirely in keeping with the idea concerning the nature of the wall substance in the area of increase of wall substance.

CYTOPLASMIC CONTENT OF ROOT HAIRS

In very young root hairs the cytoplasm is very dense and more or less homogeneous. As the hair elongates, vacuoles appear, and most observers report an accompanying activity of the cytoplasm resulting in streaming throughout the cell in both main and cross currents. Within these lines of flow are irregular flocculent masses of material as well as spherical "glistening bodies" of many different sizes. These latter structures are highly refractive and very numerous in root hairs which are produced in alkaline solutions.

It was with this type of cell that Mr. Farr attempted to study the effects of simple nutrient solutions, with the hope of being able to interpret the effect of ions or of small groups of ions upon the process of cell enlargement.

One kind of plant, the very young seedlings of Georgia Collards, has been used throughout the experiment. The rate of growth of the aquatic root hairs has been tested in single nutrient salt solutions. The necessity for calcium in the external medium determined the choice of calcium salts in the different experiments performed:

Distilled water
$Ca(OH)_2$
$CaCl_2$
$Ca(NO_3)_2$

$CaSO_4$
$Ca(H_2PO_4)_2 H_2)$

Kisser first demonstrated the necessity for the presence of calcium in root hair formation. After having failed to pro-

duce hairs in chambers of calcium-free glass upon Ca-free cloth, he was able to obtain them abundantly by the addition of very slight traces of Ca. This has been confirmed again and again by both Mr. Farr and myself in repeated failures to produce aquatic root hair growth upon the roots of Georgia Collards in pure distilled water, and their profuse production in very dilute solutions of $Ca(OH)_2$,—as low as 0.000010 M.

FORMAN T. McLEAN
Secretary

MEETING OF MARCH 5

This meeting was held at the American Museum of Natural History with twenty-six members present. President Denslow called the meeting to order at 8:30 P. M.

The following new members were elected:

Mr. A. H. Cockayne, Director, Plant Research Station, Palmerston, North, New Zealand; Mr. John Adam Moore, Department of Botany, Washington State College, Pullman, Washington; Mr. Leon W. Bowen, 77 Evergreen Avenue, Bloomfield, New Jersey; and Mr. C. L. Lundell, Columbia University, New York City.

Dr. J. S. Carling of Columbia University gave a lecture on "Diseases of Characeae." He told some of the puzzling relationships of these organisms and their curious life histories. The lecture was illustrated by lantern slides.

After the lecture, the meeting adjourned to refreshments of coffee and cake, provided by the entertainment committee, served in the bird hall.

FORMAN T. McLEAN
Secretary

NEWS NOTES

In this issue we have a short article by Dr. Harshberger on the bracts of Mendoncia. Dr. Harshberger had written us of his intended trip to New Zealand and Australia which was to have been started the end of May. In the midst of his plans he was suddenly taken ill and died on April 27th. Since 1892 Dr. Harshberger had been connected with the botanical department of the University of Pennsylvania. He was in his sixtieth year.

The newspapers have recently contained numerous articles on the appearance of the Mediterranean fruit fly in Florida and the quarantine established by the national government in cooperation with the state in the effort to prevent its spread. The fruit fly has been a serious pest in many countries for several centuries past. The fly attacks nearly ripe fruit, laying its eggs in the fruit, where they develop into maggots. As many as 600 eggs may be deposited in a single fruit. Almost any kind of fruit—apples, peaches, cherries, tomatoes, mangoes as well as the citrus fruits are attacked. In the regions where the fruit fly has been found all fruit and vegetables will be either destroyed or processed and from areas of nine miles around the infested ones none can be shipped without rigorous inspection and certification.

The gold medal of the Linnean Society of London has been awarded Professor Hugo de Vries, of Lunteren, Holland, in recognition of his work on mutations. (Science)

At the Fifth International Botanical Congress to be held in Cambridge, England, in 1930, motions on the subject of nomenclature will be considered. Such motions, printed in Latin, English, French, German, or Italian must be in the hands of the Rapporteur général, Dr. John Briquet, Conservatoire botanique, Geneva, Switzerland, before September 30, 1929.

At the Allegany School of Natural History in Allegany State Park, western New York, Mr. William P. Alexander has established an Indian Garden which not only shows all of the plants used by the Indians for food, fibers, dyes and medicines, but also trys to show the Indian's ideals of conservation. The Indian medicine man saved seeds of the plants he used and when gathering the plants chanted a song to the effect

> "I will not destroy you, but plant your seeds,
> Plant them in the hole from which I take you."

All the world's the stage in "Naturalized Plant Immigrants," a new 3-reel picture just released by the Office of Motion Pictures of the United States Department of Agriculture. From windswept plains of Manchuria to the reeking jungles of the tropics one is taken with the department's plant explorers on a search for plants of potential economic value in

the United States. "Year after year," to quote the final subtitle of the picture, "the search for new plant material goes on, and so are obtained new crops, new foods, new ornamentals, and new raw materials for American farms, markets, arts and industries."

Many citrus producers in California are now keeping records of the production of each tree in their orchards. These individual tree records enable the growers to locate good orange, lemon and grapefruit trees from which to take bud wood for top-working poor trees. In Farmers' Bulletin No. 794-F, Citrus-Fruit Improvement, recently issued by the United States Department of Agriculture, Mr. Shamel describes the methods of keeping and using tree-performance records and comments on the results obtained by those who have followed the practice over a period of years.

On the evening of May 13th a dinner was given in honor of Dr. Aven Nelson at the Commons of the University of Wyoming. The occasion was the 70th birthday of Dr. Nelson. For 42 years he has been connected with the University, part of the time as president. He has built up a large herbarium of the Rocky Mountains and is the author of numerous works on the flora of the Rocky Mountains.

The Botanical Society of America will meet at Dartmouth College, Hanover, N. H., from June 25 to the 28th.

The Pharmaceutical Society of Great Britain has awarded the Hanbury medal "for high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs" to Dr. Henry Hurd Rusby, professor of materia medica in the college of Pharmacy of Columbia University. It is understood that Dr. Rusby will go to England in October to receive the award. (Science)

A herbarium of 40,000 specimens of plants, owned by Dr. Charles Atwood of Moravia, who died recently, has been presented to Cornell University. The plants were obtained from all parts of the country, but the majority are from central New York. (Science)

Dr. Sam F. Trelease has been promoted to a full professorship of botany in Columbia University.

THE TORREY BOTANICAL CLUB

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TORREY BOTANICAL CLUB

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A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 55, published in 1928, contained 562 pages of text and 15 full page plates. Price $4.00 per annum. For Europe, $4.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE —a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–55 can be supplied separately at $4.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (50 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–17 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **Index to American Botanical Literature,** reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

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BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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THE TORREY BOTANICAL CLUB

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All persons interested in botany are invited to join the Club. There are two classes of membership: *Sustaining*, at $15.00 a year, and *Annual* at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each Month at the American Museum of Natural History, New York City, and the third Wednesday at the New York Botanical Garden.

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GEORGE T. HASTINGS
2587 Sedgwick Ave.
New York City

TORREYA

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July-August, 1929

The Trap of Utricularia

R. Darnley Gibbs

'If a man can write a better book, preach a better sermon, or make a better mouse-trap than his neighbour, though he build his house in the woods the world will make a beaten path to his door.'

—Attributed to Emerson.

Carnivorous animals capture their prey by swiftness or by cunning. While most rely upon speed others are constrained to set traps for the reception of the victim. The Ant-lion (*Myrmeleon*) with its sand-pit, many Spiders with their webs and Man are examples. The last may be termed a facultative trap-setter and the victim may or may not serve as food.

Plants on the other hand lead sedentary lives and are not as a rule adapted to a diet of flesh. There are, however, exceptions—plants that feed upon animals—a fact that has moved someone, somewhere, to poetry:

'What's this I hear
About the new Carnivora?
Can little plants
Eat bugs and ants
And gnats and flies?
A sort of retrograding;
Surely the fare
Of flowers is air,
Or sunshine sweet:
They shouldn't eat,
Or do aught so degrading.'

'Bugs and ants and gnats and flies,' mosquito larvae, oligochaete worms, copepods and soforth are acceptable to these retrogrades. In all cases the plant—be it *Drosophyllum,* the 'flypaper' plant of Portugal, or *Dionaca* of South Carolina with its wonderful 'steel-

trap' leaves—sets forth its traps and waits for its prey; which brings us to a consideration of traps in general and in particular to those of the plant that Goebel has been quoted as declaring the most wonderful plant of all.

What should we expect of a trap? In order to be effective it should be well located or failing this should be made attractive to the victim. Of location we shall have more to say below: of attraction much might be written. Thus, in the case of the Sundew, the leaves, deadly though they are, are supposed to attract by virtue of their appearance. The colouring of *Sarracenia,* it is suggested, may have this function.

Traps, like jails, must prevent escape unless (and this happens rarely) the victim is killed at once. It is probable in the case of the Venus flytrap that the psychology of the fly alone renders the trap effective, for the struggles of the insect, by acting as a repeated stimulation, seems to prevent opening of the trap.

Additional merits would consist in a self-setting mechanism and a selective capacity for the rejection of unsuitable material. This last, perhaps, is expecting too much, but we shall see.

In the tropical and temperate regions of the earth are to be found the more than two hundred species of the genus *Utricularia* —the Bladderworts—flowering plants that inhabit a wide variety of situations. Some are epiphytes in the rain-forests of the tropics, others affect more lowly stations and grow on moss and humus. Others again, including all the species of the temperate zones, are aquatics and the flowering stems alone appear above water to bear the showy blue, yellow or white flowers. In one remarkable case the plant lives only in the water collected in the bases of the leaves of a large *Tillandsia* and Gardner (1846) tells us: '. . . propagates itself by runners, which it throws out from the base of the flower stem; this runner is always found directing itself towards the nearest Tillandsia, when it inserts its point into the water and gives origin to a new plant, which, in its turn, sends out another shoot; in this manner I have seen not less than six plants united.'

It is an aquatic species of the North Temperate zone—*Utricularia gibba* L—that is the subject of the following description.

This plant is widely dispersed in North-Eastern America. It grows entirely submerged during the greater part of the year, lifting but its flower stems with their bright yellow blooms three or four inches above the water. The submerged stems are slender and flexuous; their diameter scarcely a quarter of that of an ordinary pin. They may exceed a foot in length. At intervals of one quarter to one half of an inch appear the so-called leaves; structures more slender still which not infrequently branch and which may be, as on the specimen before me, a third of an inch in length. The tip of the stem is inrolled so that it looks rather like a young fern-frond. Both leaves and stem are green and share the work of assimilation.

Near the leaf base and shortly stalked, is to be found the bladder or utricle which is responsible both for the technical and common names. It may be almost colourless, delicately green or with age dark blue, but even in the last case is fairly transparent. The wall of the bladder is of two layers and it is anthocyanin dissolved in the cell-sap of the inner of these that gives the blue colour to old bladders. Nothing of the nature of a root is to be found. Viewed against a dark background, as under natural conditions, we see the picture represented in figure 1.

Let us consider now the bladders for it is to the possession of these that *Utricularia* owes its position of supreme interest.

The bladder has approximately the bulk of a pin's head. Viewed from the side it is pear-shaped, two long, branching antennae (the term is Darwin's) gracing the narrower, forward end and forming wing-fences, as it were, to the vestibule. In order fully to understand the origin of the latter structure we must remember that the forward end of the bladder is closed by a door which is situated well back in the mouth of the trap. The walls anterior to this form the vestibule.

We have said that the main walls of the utricle are of two layers. One should qualify this by adding that two regions are exceptional, the first in having a prolongation of the vascular tissues of the stalk along the ventral and dorsal parts of the bladder, the second in that it forms a relatively rigid and massive 'doorstep' immediately under the door (figs. 2, 3 and 5). Unlike most doorsteps this structure does not end abruptly on either side but merges gently into the lateral walls in a long upward sweep. The

cells composing it are larger than any of the other cells. Its upper surface has a curious structure which has led us to refer to it somewhat facetiously as the doormat (fig. 2); of this more beyond.

A close examination of the door reveals its rather complex and entirely surprising nature. It must be studied *in situ* in order to understand its functioning for its shape when injured is very different from that of the living door. It is attached to the walls of the bladder along perhaps two thirds of its periphery—making a hinge that takes the form of a wide arch composed of the top edge and the upper curves of the lateral edges. The doorstep, it will be remembered, merges into the lateral walls and its upper limits are found to coincide with the lower limits of this hinge. The edge of the door is free, then, for approximately the length of the doorstep. The door is not a plane structure but presents a convex face to the outside. This convexity is communicated to the free edge and results in the rather curious path followed by it. Let us consider this in some detail for it is here that recently discovered facts throw light on a mechanism that has intrigued botanists for seventy-five years.

We have first to describe the general mechanics of the trap. It is easy to see that the bladders of a plant differ in shape one from another and we may distinguish three distinct states. Thus, in figure 4 the same trap is shown as it appears at different times. The middle photograph represents it with the lateral walls showing a slight dimpling. In the course of half-an-hour or so this concavity had increased considerably giving the trap the shape figured to the left. The remaining photograph was taken after the bladder wall had been pricked with a fine needle. Czaja (1922-4) and Merl (1922) noted these changes in form.

It is wise before considering the significance of these changes to continue observation of bladders under natural conditions. The small animals that may be found in the pools inhabited by *Utricularia* frequently enter the vestibules of the bladder and move about in it in a manner that suggests the presence of some attractive substance. If the trap is in the markedly dimpled condition a surprising sequence of events follows. There is a momentary commotion and then we may see one or more animals within the trap, their escape prevented by the closed door, and the walls of

the bladder are observed to have resumed the position shown in the middle photograph of figure 4. If, now, we prick the wall the utricle expands instantly to the form pictured in figure 4C and remains expanded.

The extreme rapidity of the trapping is made evident by a motion picture, two successive frames of which are shown in figure 7. It will be seen that in the upper photograph a worm is outside the trap: in the lower the greater part of it is within. It happened in this case that the worm was about to divide and when the trap was sprung division was completed, one portion of the worm entering, the other remaining outside!

It is not necessary to wait for an animal to spring the trap: we may use the tip of a fine needle for the purpose. If the bladder is detached from the plant and a slender glass rod is presented to it, it will swallow it, actually jumping at anything that trips the mechanism (figure 8) as observed by Czaja (1922a). We are driven to the conclusion that an inrush of water carries the prey into the trap. If tripped in air the bladder will swallow a bubble of it (figure 6). When plants are lifted from the water it is usual to find that many of the bladders contain air—the traps are sprung as the water flows from the plant. Ekambaram and Brocher actually heard the clicking sound made by the springing traps.

We are now in a position to consider the facts related above. There are two possible 'explanations' of the inrush of water. It might be supposed that sudden turgor changes in the cells of the lateral walls cause them to become less concave. Such a change would not be unique for their are many cases recorded of just such an alteration of turgor. The evidence, however, is all in favour of the view that water is pumped out of the bladder during the transition from the tripped to the set condition. It has been shown that a tiny hole in the wall of the trap or the insertion of a fine bristle under the edge of the door is sufficient to prevent the setting of the trap (Czaja).

If there is indeed a pumping out of water leading to a 'negative pressure' within the utricle it is necessary to assume that the door is water-tight or that any leakage that occurs is so slight as to be unimportant. When traps in the set condition are placed in water containing india ink no leakage can be detected. We have watched such traps for days and in no case have we seen leakage or noticed an automatic springing of the mechanism.

It is now proper to return to a further consideration of the door with a view to understanding how it is rendered water-tight. We have remarked already that the free edge of the door follows a curious course. It starts on either side where the rear edge of the doorstep merges with the lateral walls and traverses the sloping portions of that structure. Its central portion lies just in front of the doorstep.

That this of itself would form a water-tight joint has seemed improbable and careful observation has revealed the presence of a thin, almost transparent 'veil' immediately before the door and following closely the anterior edge of the doorstep (figures 2, 5 and 10) (Loyd, 1929). Although the free edge of the door starts at the rear edge of the latter the door itself bulges against the veil throughout its length and possesses triangular wings that are closely applied to the lateral parts of the doorstep. In these facts we have, to my mind, a possible explanation of the observed fact that the trap when sprung is not usually distended to the utmost (refer to figure 4). If the veil functions as a valve it would seem that a certain difference of pressure between the interior of the bladder and the outside water is necessary to keep it closely pressed to the door. There is a difference of pressure when the trap is in either the set or the sprung state and it is only when the door is held open or when the bladder wall is pricked that pressure equilibrium seems to exist.

Such an explanation may appear fanciful but we must remember that the mechanism must approach perfection before it can function in the manner observed. It is interesting to notice that even this remarkable trap fails on occasion and the victim is jammed in the entrance (figure 9). When this happens the trap is unable to function.

The tripping of the mechanism, leading to the opening of the door and the resultant inrush of water, is brought about, as far as we can tell, by depression of the trigger hairs which project from the door. Immediately above the point of attachment of these bristles is a thin, easily flexed region of the door and it seems likely that a downward movement of the hairs results in a bending of the door at this point and the lifting of the central portion of the edge from its position before the doorstep. The inrush of water then opens the door but it closes again before equilibrium can be at-

tained. How else explain the fact that the bladder in the tripped state can still take in water?

There remain to be described the varied hairs that decorate almost all parts of the bladders. Observation of these reveals the fact that they all are built upon the same general plan, having three cells as the fundamental unit. These may be termed basal, stalk and head cells. On the outer parts of the trap the hairs are very short and deeply sunken. In the porch they are long and slender and on the door itself they are different again. (Withycombe 1924).

Within the trap are hairs of two kinds. Scattered over the wall are the so-called quadrifid hairs which have heads composed of four radiating cells. It is supposed that these are digestive glands or that they absorb water from the cavity and help to pass it to the outside (figure 12). The other hairs are similar but are bifid and are restricted to a limited area on the slope of the doorstep that faces the cavity of the bladder. The upper surface of the step itself (the 'doormat') is a closely packed layer of modified hairs and it is the cuticle of these that forms by exfoliation the veil that is adpressed to the door edge (Lloyd) (figures 2 and 3).

We cannot doubt the power of *Utricularia* to kill and digest its prey for we have seen time and again the death and digestion of oligochaete worms and other animals. Death follows capture relatively quickly, varying enormously, however, from trap to trap and taking place most quickly, as far as our observations go, when the victim is an oligochaete worm. As an example of the rapidity with which the trap may repeat its feats we will quote but a single case. A trap was observed to catch a large worm and was placed on one side that we might watch the process of digestion. We were surprised to find, after a lapse of thirty-five minutes, that the bladder had captured a second, equally large victim.

Death of a worm may take place in a couple of hours and in less than a day nothing but a small amount of detritus remains. The process is far too rapid for bacterial action to be responsible for the change.

This description has been confined almost in entirety to facts and we pass now to the realm of history, fancy and speculation. There is scope enough here as even a casual glance at the literature will show.

While it is possible to observe in a short time all the facts related above we must remember that it is the work of many men that has taught us to observe the traps and correctly to interpret our observations.

The earlier investigators failed to grasp the significance of the bladders. Thus we find that the Crouan brothers (1858) thought them protective devices and regarded the quadrifid hairs as root-hairs. To others the bladders were flotation organs and Darwin (1875) occupied himself for a while in disproving that possibility.

No fewer than four people, as Skutch (1928) reminds us in a recent review, discovered independently that the trap is an active mechanism. These were Brocher of Belgium (1911), Ekambaram in India (1916), Withycombe in England in the same year and lastly Hegner in the New Yorld in 1925. Darwin himself more than fifty years ago came within a hairsbreadth of making the same discovery!

The catholic taste displayed by *Utricularia* has intrigued many and the literature is full of references to the variety of organisms trapped. Among the most interesting observations in this field are those of Goebel (1889) and it will be not inappropriate to select one from the many. *Utricularia intermedia* and *U. vulgaris* when grown together caught quite different animals, the former securing *Cypris,* the latter Copepods. Goebel connected these facts with the observation that *Cypris* is a creeping form and is therefore more likely to meet with the rooted *U. intermedia,* while the freely floating *U. vulgaris* is well situated to trap the swimming copepods.

Hegner (1926) records the capture of Paramoecia: we on the other hand, have not seen this with *Utricularia gibba.* This may be due to some slight differences that prevent our plants from trapping Paramoecia. He would be a brave man, though, who would draw any conclusions from the negative results of observation for no less than seventy-five years of observation passed before Lloyd recorded the veil which seems to seal the door, and it was but twenty years ago that Brocher observed the springing of a trap!

We might speculate along a dozen lines without exhausting the field. We know nothing of the method by which water is pumped out of the traps. What are the digestive enzymes of the bladders

and is secretion stimulated when animals are trapped? Is the *Euglena* that inhabits old bladders immune to these enzymes or are such old traps no longer functional?

In spite of the work of the investigators quoted, together with that of Buesgen, Cohn and others, we have before us today, in a modified form, to be sure, what Brocher nearly twenty years ago called 'Le Probleme de l'Utriculaire.'

My thanks are due to Professor F. E. Lloyd for his unfailing help. I am indebted to him also for permission to reproduce figures 1, 2, 4-8, 10 and 11.

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DESCRIPTION OF FIGURES

1. *Utricularia gibba* L. Portion of plant, about twice natural size.

2. Section of doorstep.

3. Diagram of section of doorstep. a, bifid hairs on inner slope of the step, b, the pad of modified hairs forming the doormat, c, the veil, d, slender hairs which are numerous in the vestibule, e, glandular hair of the outer wall.

4. A single bladder photographed: A. in the set condition, B. after tripping, C. after pricking the wall.

5. One-half of a doorstep viewed from above. To the left is shown the sloping portion merging with the lateral wall of the bladder, below is the inner edge of the step with its bifid hairs, above is the veil.

6. A bladder tripped in air, showing the air bubble swallowed by it.

7. Successive frames from motion picture. In the upper photograph the worm is outside the trap, in the lower it has been engulfed. Time interval about one-sixteenth of a second.

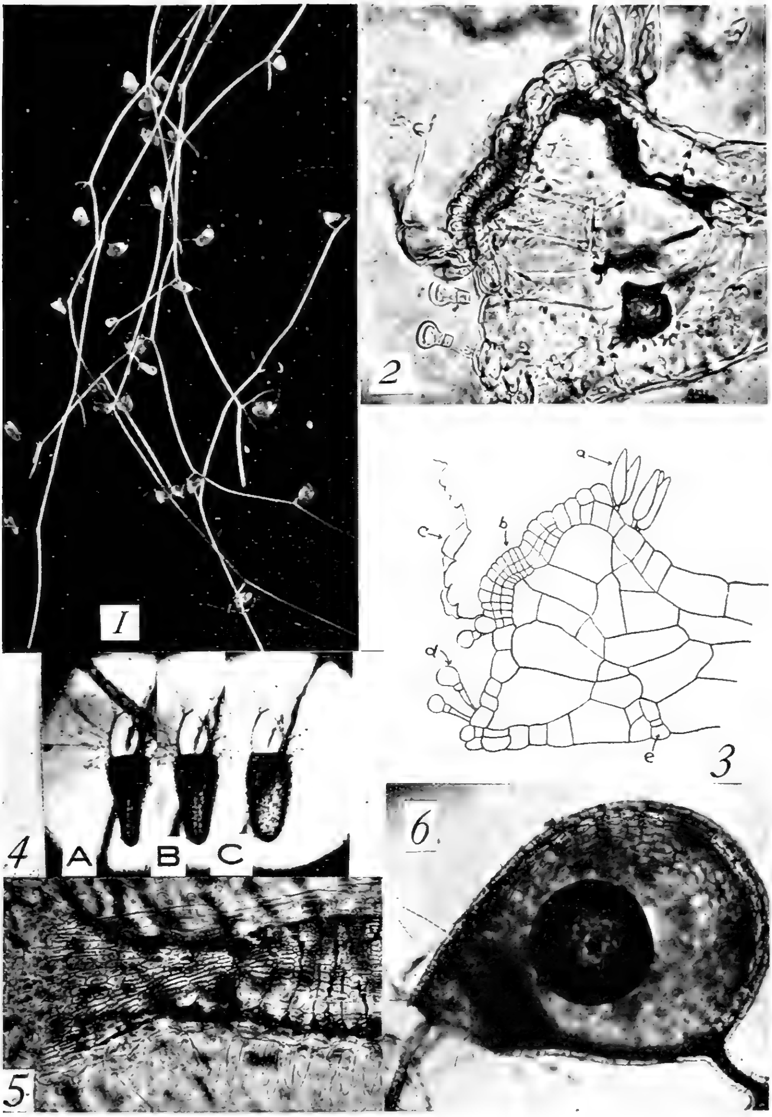
8. A detached trap that has swallowed a glass rod which tripped it.

9. In this case the door closed on a worm and jammed it against the doorstep.

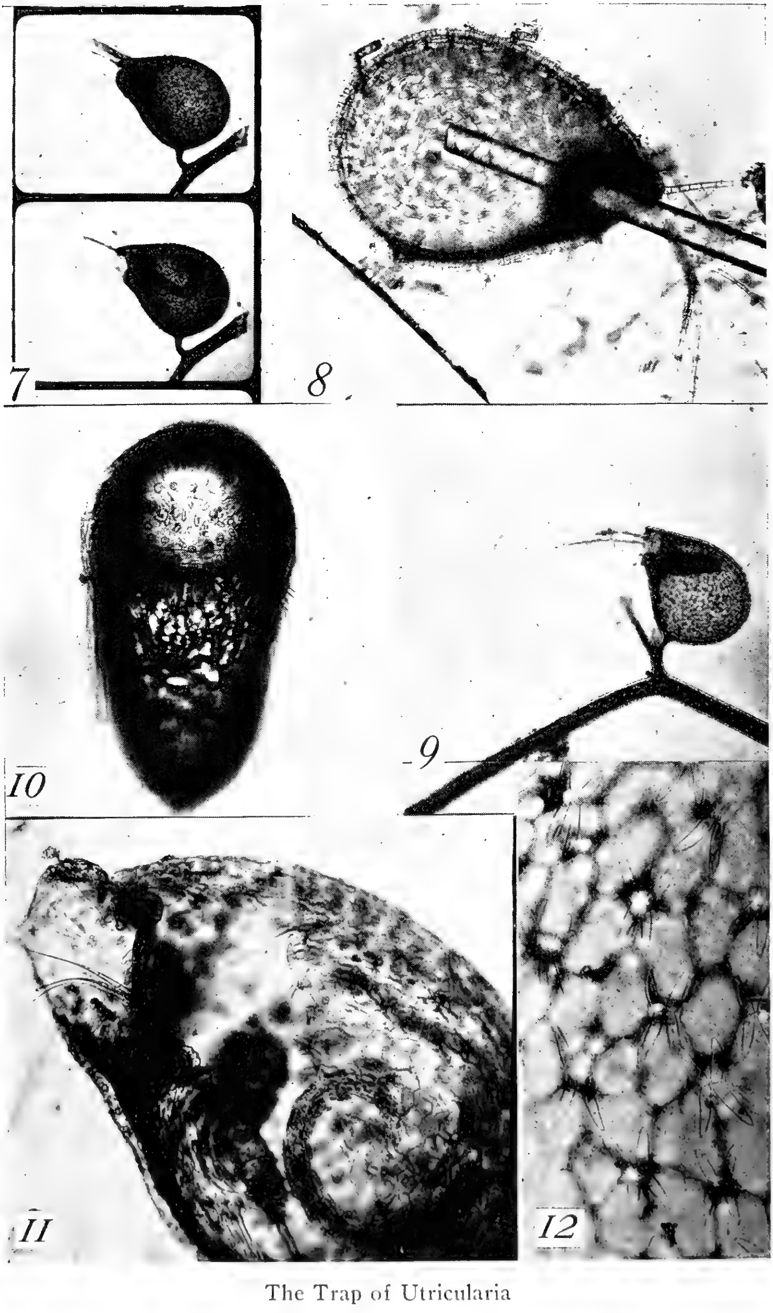
10. A living trap viewed from the front to show the veil.

11. Anterior portion of bladder with part of the lateral wall cut away to show the door, the four trigger-hairs and the doorstep. Note the remains of a worm and a copepod.

12. Inner wall of bladder with quadrifid hairs.



The Trap of Utricularia



The Trap of Utricularia

The Evolution and Classification of Roses

T. D. A. Cockerell

The paper on *Rosa* by Dr. C. C. Hurst of England, presented to the Genetics Congress in Berlin in 1927[1], is of extraordinary interest to botanists. It offers a classification of the genus *Rosa,* based mainly on cytological evidence, or at least the concurrance of external characters with cytological conditions. Starting with the admitted fact that the gametes of roses carry a minimum of seven chromosomes, it is shown that when this number is exceeded we have multiples of seven, even up to fifty six. The forms with the minimum number, fourteen in the somatic cells, are called diploids; those with higher numbers polyploids, or more specifically triploids, tetraploids, pentaploids, etc. This of course, parallels what has been found in other organisms. In all 1,006 different species and forms of *Rosa* have been examined cytologically, or had been when Hurst's paper was written. Of these Hurst himself examined 674, and the whole series represents all the recognized sections and subsections of the genus. Beginning with the diploids, it is observed that they fall into nine distinct groups. Four of these are so distinct that they are excluded from *Rosa* altogether, under the following generic names:

Hulthemia, for *H. persica* (Michx.) of the deserts of Central Asia.

Platyrhodon, for *P. microphylla* (Roxb.) of China and Japan.

Ernestella, for *E. bracteata* (Wendl.) of China and *E. involucrata* (Roxb.) of India and Burma, the latter regarded as a subspecies.

Hesperhodos, for *H. minutifolia* (Engelm.), *H. stellata* (Wooton), and *H. stellata mirifica* (Greene) all of the arid region of North America. Hurst treats Wooton's *R. stellata* and Greene's *R. mirifica* as subspecies of *H. minutifolia.*

There now remain five groups, true members of *Rosa,* which are designated AA, BB, CC, DD, EE, with gametes A, B, C, D, E. The characters of all of these groups are cited; most are morphological, but some physiological, as the late ripening of the fruits.

[1] C. C. Hurst. Differential Polyploidy in the Genus Rosa, L. Verh. Internat. Kongresses f. Vererbungslehre, Berlin, 1927. Supplbd. Zeits. f. induktive Abstammungs und Vererebungslehre. 1928. pp. 866-906.

The AA forms are numerous, including *R. sempervirens* L. of S. Europe and N. Africa, *R. arvensis* Huds. of Europe, *R. multiflora* Thunb. of Korea and Japan, *R. setigera* Michx. of North America, etc. The BB group includes nine Asiatic roses, but also the American *R. gymnocarpa* Nutt. CC is the *R. rugosa* group, including the American *R. nitida* Willd. DD is the group of *R. cinnamomea,* with several American species, such as *R. blanda, R. fendleri,* etc. EE, the group of *R. macrophylla* Lindl., is exclusively Asiatic, and almost confined to China. Hurst states that each of these groups may be considered a species, the various forms being ranked as subspecies under that carrying the oldest name. He does not, however, make the trinomials, and botanists are not likely to reduce in this manner a large number of roses hitherto regarded as of specific rank. In addition to the cited forms, it is explained that there are very numerous varieties. A subspecies is always homozygous for the subspecific characters, but a variety is frequently heterozygous for the varietal characters. Thus the subspecies ranks with the species rather than with the variety. It was found in the case of the AA roses, that so far as tested in crosses, they were fully fertile in the F_1 and F_2 generations,—an argument for considering them a single aggregate species. However, the most casual examination of the groups shows great diversity among the so-called subspecies. For example *R. nitida* is extremely unlike *R. rugosa,* and is usually placed in a different section. We are thus compelled to admit that the five groups are themselves complex, so that AA, BB, etc. are generalized conceptions, not implying genetic uniformity beyond a certain point. An alternate classification might conceivably include over fifty groups, instead of five. Nevertheless, there is a theoretical basis for the limited number of groups or aggregate species, namely that within these groups the sets of chromosomes are homologous in the sense that they are capable of pairing or forming synaptic mates, in consequence of which the hybrids should be fertile. Thus A may in fact be A_1, A_2, A_3, and so forth, through a series of modified forms, which are typically homozygous A_1, A_1, or A_2, A_2, etc., but can form hybrids A_1, A_2, etc. when artificially crossed, or where their ranges meet.

We now come to the polyploid roses, which are very numerous. First of all are the duplicational polyploids, such as AAAA, which

does not differ from AA in the kind of chromosomes, but only in having two sets. They are thus like *Oenothera gigas,* and are found to exhibit a marked increase in size of all their parts. In certain cases triploids, as AAA, have been found among garden varieties. Hurst remarks that they may have arisen "from a duplicate gamete AA arising in a diploid AA, or from a cross between diploid AA and tetraploid AAAA, or from a bud sport derived from a somatic cell of a tetraploid AAAA that had lost a set of chromosomes."

The differential polyploids are those containing more than one kind of septet of chromosomes; these are divided into regular and irregular. Thus *Rosa huntii* Hurst (a new species from China) is AABB. *Rosa centifolia* L. is AACC. *Rosa palustris* Marsh is AADD. *Rosa davidi* Crep. from China is AAEE. *Rosa spinosissima* L. is BBCC. *Rosa pimpinellifolia* L. is BBDD. *Rosa multibracteata* Hemsl. & Wils. from China is BBEE. *Rosa virginiana* Mill. is CCDD, as also are *R. suffulta* Greene, *R. lunelli* Greene and others. No CCEE species is yet known. *R. pendulina* L. is DDEE. In addition to these tetraploids, there are hexaploids, as the beautiful *R. moyesii* Hemsl. & Wils. (AABBEE), which I saw growing at Cambridge; *R. wilsoni* Borr. (AABBCC) of Wales, Ireland and Scotland; the North American *R. nutkana* Presl. (AADDEE) and *R. engelmanni* Wats. (BBDDEE). There are even a few octoploid species, namely *R. tackholmii* Hurst n. sp. (AABBCCDD) from Iceland, and *R. acicularis* Lindl. (BBCCDDEE), circumpolar in subarctic regions.

The remaining group contains the irregular septet species, in which only part of the groups have synaptic mates. Such species are confined in nature to temperate Europe and Western Asia in an area approximately equivalent to that covered by the Pleistocene glaciation. Apparently they do not occur as far east as Lake Baikal; at least I believe none of the material I obtained there was so referable, though the results of Hurst's examination of it have not yet been reported. "All these species present the phenomenon at present unique in plants and animals, of a regular but unequal reduction division in female gametogenesis, which causes them to produce female gametes carrying from two to five times as many septets of chromosomes as their male gametes, so that their reciprocal hybrids are entirely different in their chromosome content and

in their characters"—(Hurst, p. 891.) The pollen is only partly fertile, but the plants reproduce apomictically, and within their area flourish exceedingly. Here belong the familiar and variable dog-roses of England, Harrison and Blackburn[2] give a table showing the percent of fertile pollen in the *R. canina* group, ranging from those (*R. subcristata, R. fugax, R. coerulea*) in which the whole of the pollen aborts, to those (*R. senticosa, R. mollis*) in which it is 75 to 90 percent good. They tested many of these plants by castrating and bagging them, and without exception seeds were set. Comparison may be made with the condition in *Hieracium,* which is likewise polymorphic. The formulae have been worked out for a number of these irregular polyploids, and the following may serve as examples:

R. mollis Smith, CDDE, male gametes D, female CDE.

R. rubrifolia Vill. ADDE, male gametes D, female gametes ADE.

R. canina L. AABDE, male gametes A, female gametes ABDE.

R. rubiginosa L. ABBCD, male gametes B, female gametes ABCD.

Finally descriptions are given of numerous experiments in crossing the various roses, and it is stated that these appear to fully confirm, or to be fully in agreement with, the theory set forth. In a former paper Hurst[3] sets forth his ideas concerning the evolutionary significance of all these phenomena but since then he has somewhat modified his views. The following statement is quoted from a paper which he read before the Linnean Society in 1926, a typewritten copy of which he has kindly sent me: "The original decaploid species would most probably arise by duplication of an ancient diploid species under luxuriant conditions, just as duplicated forms have arisen under cultivation. This would be followed, in geological time, by differentiation of the five double septets of chromosomes and characters by duplicational segregations and gene mutations, thus giving rise within itself to the potentiality to throw off numerous new septet species by losses of septets. In this way evolution would be an alternating process, from diploid to

[2] The Course of Pollen Formation in Certain Roses, with some deductions therefrom. Memoirs Horticultural Soc. New York, July, 1927.

[3] Chromosomes and Characters in Rosa and their significance in the origin of species. Genetics, XXXVIII (1925).

polyploid species (i.e., creative) and from polyploid to diploid species (i.e., emergent), according to geological conditions. This mechanism of alternating creative and emergent evolution in association with other secondary processes such as hybridization and chromosome mutations of the *Oenothera lata* type would also serve to explain the origin of the Tribes and Families of the Order Rosales, including the numerous extinct species eliminated by natural selection." (I independently reached similar conclusions, about the same time, as set forth in "Nature," April 10, 1926). It may be added that if polyploids are built up as postulated, they have two advantages as sources of divergent types. One is that if mutations occur once in so often, there is more chance for them in a polyploid with its greatly increased number of genes. The other is that such mutations, which might be injurious or fatal in a diploid may survive in a polyploid, until such time as circumstances favor some type of plant which they represent. On the question whether hybridization has played a large part in the evolution of roses, opinions differ, though no one disputes the fact that very numerous hybrids occur in nature. Blackburn and Harrison, in the paper already cited, conclude that the irregular polyploids arose through hybridization; and would also explain the regular or balanced polyploids in the same manner. In the latter case they suppose that the plants attained fertility "simultaneously with, and as a direct consequence of, a doubling in their chromosome complements". They dispute many of Hurst's findings in detail, and especially stress the case of *R. wilsoni,* which Hurst calls a true hexaploid species, but which they assert to be a hybrid between *R. pimpinellifolia* and *R. tomentosa,* the latter the pollen parent. Such a hybrid, if I understand Hurst's notation, should apparently come to nothing, but Blackburn and Harrison state that theoretically it ought to have 14+7 as its somatic number of chromosomes, whereas it actually has 42. (This number 42 agrees with the view that it is a hexaploid species). They add: "Obviously chromosome doubling by some means or other has occurred, but, what is most noteworthy, although the reciprocal hybrid is unbalanced and sterile, this is balanced and fertile. Thus we have generated before us, by the union of an egg with 14 chromosomes and a pollen grain with 7, a fully fertile hexaploid rose." In other words, a veritable species has been produced by hybridization.

The subject is so complex and the investigations are so new, that it is unreasonable to expect any approach to finality. Yet it is evident that, no matter what may be said about this or that alleged fact, there is here opened up a most fertile field for research, with reasonable expectations of seeing into the processes of evolution in a manner never before considered possible. Taxonomy, also, takes a new meaning, and may attain more precision than seemed possible in such polymorphic genera. We are encouraged to examine the face of nature, searching for evidence in all directions. New types may come into existance to perish at once, or may survive a little while, and eventually perish, or may spread in ever widening circles. Thus local forms are not necessarily relict species, survivors of a once mighty host. Furthermore, as far as can be seen, there is no reason a species should not be polyphyletic, in the sense of arising more than once from similar ancestors, in different places. When this occurs, there will be a probability that the ancestors will not be exactly alike, but will differ in at least some genes, so that the separate colonies (as we call them) of a species may be distinguishable on very close inspection. That this is true of varieties, we are all aware, and no one doubts that the identical gene mutations occur many times independently.

It will be interesting to see if novel climatic conditions have any effect on the variable roses. There is a member of the *R. canina* group supposedly naturalized in Mexico. At Wallangara, on the southern border of Queensland, I found plenty of the irregular pentaploid *R. rubiginosa* growing. These exotic colonies should be closely watched. If their chance for differentiation depends on hybridization, then they are likely to be more constant than at home. Also at Wallangara, *Raimannia odorata*, another plant of interest to the geneticists, has run wild.

It is possible to postulate a scheme of evolution for *Rosa* which requires neither the breaking up of a hypothetical decaploid nor the building up of polyploids by hybridization. Hurst's diploid aggregate "species" may have developed from an ancestral diploid by a process of gene mutations, exactly as the segregated species or subspecies have developed within these aggregates. Then the polyploids may owe their origin to chromosome duplication, and the diversification of their septets (groups of seven chromo-

somes) to subsequent gene mutation. This implies parallel mutation, which is known to occur. Vavilov has shown in the most striking manner how parallel variations, through long series, arise in related genera of plants, where no question of hybridization is involved. On this basis a tetraploid AABB rose may have evolved from a diploid AA, and the B septets it contains may only simulate those of the diploid BB, without having any genetic connection. This leaves the irregular septet forms as probably of hybrid origin, and as Hurst remarks, several of them are actually known to be hybrids. With regard to the fossil roses, it must be remembered that the Florissant species date from the Miocene, and occur with a flora which is not more primitive than that of the present day. Chaney[4] has identified one of the Florissant species (*Rosa hilliae* Lesqx.) in the Bridge Creek (Tertiary) beds of Oregon, his material consisting of detached leaflets and a piece of stem with prickles. There is no more basis for referring this material to *R. hilliae* than to any one of several living species; nor, I think, any reasonable probability that it belongs to Lesquereux's species. Chaney speculates on the possibility that all the Florissant rose leaves belong to one species, and suggests that *R. ruskiniana* Ckll. represents the fruit of this species. As a matter of fact, *R. ruskiniana* was based on a bud and its fruit is unknown. I think there is no doubt that *R. hilliae* and *R. wilmattae* Ckll. are quite distinct, but *R. scudderi* Knowlton may be a variation of *R. wilmattae* and the other two, based on a bud and immature fruit respectively, probably belong with some of the leaves.

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Boulder, Colo.

[4] Geology and Paleontology of the Crooked River Basin with special reference to the Bridge Creek Flora. Publ. 346, Carnegie Inst. of Washington (1927), p. 123.

Three Shale-slope Plants in Maryland

Edgar T. Wherry

At a number of places in the Appalachians, between northeastern Tennessee and central Pennsylvania, argillaceous rocks of Devonian age (or rarely of other geologic ages) outcrop on the flanks of ridges, and weather into slabs and chips, which slowly slide down hill, so that little or no soil can accumulate (see figures). Only plants which are adapted to withstand exceptionally dry,

Trifolium virginicum Small, on a typical shale-slope at Gilpin, Allegany County, Maryland, May 30, 1928. Edgar T. Wherry, photo.

sterile, and unstable conditions are able to colonize such "shale-slopes," and many of the species represent various types of endemism. Some of these shale-slope endemics were discovered around 1800, and others about a century later, the typical occurrence on Kates Mountain, near White Sulphur Springs, West Virginia, having been particularly fruitful at the latter period. As, however,

very few of the hundreds of existing shale-slopes have ever been investigated by botanists, additional species no doubt remain to be recognized, and details of the distribution of already known species remain to be worked out. One addition to the list of recognized species, and several extensions of range are here placed on record.

The Longleaf Clover, *Trifolium virginicum* Small,[1] was discovered on Kates Mountain in 1892, and for 30 years no other occurrence of it was known. In 1923 Hunnewell[2] found it at Hot Springs, Virginia, but these two are the only localities definitely mentioned in the literature. In the course of field work with his classes during the past five years, Professor P. D. Strausbaugh,[3] of West Virginia University, has discovered this plant at two new localities in that state, near Burlington, Mineral County, and Sweet Springs, Monroe County. Its range has now been further extended by the finding of it in May, 1928, by participants in a Wild Flower Preservation Society field trip, at Gilpin and Pratt, Allegany County, Maryland. Instead of being exceedingly rare, as would be inferred from its representation in herbaria and published records, this plant evidently occurs more or less throughout the shale-slope region, although limited to the most barren situations. As no habitat photograph of the Longleaf Clover appears ever to have been published, one is reproduced herewith.[3a]

One of the most characteristic plants of the Appalachian shale-slopes is an erect *Convolvulus* which is not accorded a place in current botanical manuals. While related to *C. spithamaeus* L., it differs from that species in several respects. Typical *C. spithamaeus* has a lax habit, with the internodes much exceeding the petioles; the pubescence rather sparse (or exceptionally fairly dense); the leaf-blades elliptic or somewhat obovate, little if at all auricled, and conduplicate only when young; the petioles about ¼ as long as the blades; and the bracts elliptic, more than twice as long as broad, narrowed toward the base, and but slightly keeled.

[1] Mem. Torr. Bot. Club, **4**: 112. 1893.

[2] Rhodora, **25**: 168. 1923.

[3] Private communication.

[3a] While this paper was in course of publication, the clover has been found in two new Virginia localities, just west of Gore, Frederick Co., and 1½ miles west of Covington, Alleghany Co. This makes 8 stations now definitely known.

The shale-slope plant has a compact habit, with the internodes about equalling the petioles; the pubescence dense and velvety; the leaf-blades lanceolate to oblong, conspicuously auriculate with but slightly divergent lobes 5-10 mm. long, and persistently conduplicate; the petioles 10-15 mm. long, about 1-3 the length of the blades; and the bracts ovate, often nearly as broad as long, more or less cordate, and rather strongly keeled.

Convolvulus stans Michaux, on calcareous shale just north of Flintstone, Allegany County, Maryland, May 30, 1928. Edgar T. Wherry, photo.

Unlike the Longleaf Clover, this Convolvulus is not limited to Appalachian shale-slopes, but occurs occasionally on gravel derived from other types of rock, and extends a considerable distance northward, even entering southern Canada. It was apparently first recognized in the latter region by Michaux,[4] and named *Convolvulus stans.* Pursh[5] renamed it *Calystegia pubescens,* and

[4] Fl. Bor. Amer. **1**: 136. 1803.
[5] Fl. Amer. Sept. **1**: 143. 1814.

recorded its presence in the Appalachians of Virginia; there is a specimen collected by him near Sweet Springs (which lies on the boundary between Virginia and West Virginia) preserved in the herbarium of the Academy of Natural Sciences of Philadelphia. A similar, if not identical, plant was separated by Greene[6] as *Convolvulus camporum,* but its status remains to be ascertained, and the name of Michaux, having clear priority, is the one that should be used. As to how common *Convolvulus stans* may be toward the northern end of its range I have no data, but it is abundant on practically every shale-slope which I have seen, in one or more places in Alleghany, Bath and Highland counties, Virginia, and Greenbrier, Hardy, and Monroe counties, West Virginia. On the Wild Flower Preservation Society trip of May, 1928, above referred to, it was found in bloom on a ridge of calcareous shale just north of Flintstone, Allegany County, Maryland, and the photograph reproduced above was obtained. Typical *C. spithamaeus* occurs in the same or neighboring counties, in places where normal soils have developed on rock ledges, but the two can be readily distinguished at a distance or from a moving automobile, and are certainly worthy of separate recognition in botanical manuals. A good common name would be Velvet Convolvulus.

Another plant which is highly characteristic of Appalachian shale-slopes, though also growing to some extent on other kinds of rock, is the Everlasting Groundsel, *Senecio antennariifolius* Britton. This is on record from Virginia and West Virginia, but apparently not from Maryland, so the finding of it in the latter state is worth noting. In May, 1928, the Wild Flower Preservation Society members found it east of Hancock, in Washington County, and near Cumberland and Gilpin, in Allegany County, the correctness of our identification being kindly confirmed by Dr. S. F. Blake.

Although the Hairy Penstemon, *Penstemon canescens* Britton, is not a typical shale-slope plant, it sometimes grows in such habitats, and its discovery in May, 1928, east of Hancock, Maryland, may be placed on record here. In this case identification was confirmed by Dr. Francis W. Pennell.

Washington, D.C.

[6] Pittonia, 3: 328. 1898.

FIELD TRIPS

Trip of May 25 and 26 at Branchville, N. J.

The Torrey Club field trip for this weekend was a combination trip with the Suffolk County Naturalists' Club. Seventy-seven members of the two clubs registered at the Pines, a charming inn half hidden in a grove of white pines. Among those present were high school teachers representing eight of the New York City schools, nearly all of them members of the Torrey Club. Mr. and Mrs. William Gavin Taylor were official host and hostess of the party and made it a very pleasant as well as profitable occasion for everyone. With early morning bird hikes, fern, moss and general flower hikes through the day, one day spent in a survey of the geological features of the surrounding country under the direction of Dr. Henry B. Kummel, State Geologist of New Jersey, and evenings devoted to star study, the days were filled delightfully. The following account of the ferns was sent in by Dr. Benedict and Mr. Taylor has compiled a list of all birds seen.

Fern Hunting at Branchville

One of the disadvantages of fern hunting, compared with bird hunting, as noted by the frank wife of a bird enthusiast at the recent Branchville field meeting, is the fact that with ferns you have to prove your identification. The fern stays put, and if you declare some remarkable find, it is up to you to show it to every 'doubting Thomas' and prove your case. With birds, however, a quick glimpse of a brown motion at the top of a tree,—"That was a cerise-throated whiffle-bird," and down it goes on your list. I know 'wishful thinking' would exert constant pressure if ever I should take up birds seriously.

Even in ferns, it can play its part as was evidenced also at the Branchville meeting on one of the morning trips. In a deep vertical crack in a large's limestone ledge there was found a pinnate Adiantum. The wishful thinking started: "Perhaps it's *Adiantum Capillus Veneris;* that pinnate. Of course it is a small and undeveloped leaf, but the pinnate aren't lunulate enough for *pedatum.* They are more cuneate, like those of the Venus-hair fern. *Capillus-Veneris* has been found up north in the Cattskills, so it might

readily be here. This is the sort of situation it would be likely to favor. Etc." But the fern stayed right where it was, and everybody looked at it. There is no *Capillus Veneris* on the list which follows.

Despite such limitations, the fern count for the two days, starting with five after supper Friday evening, grew to eighteen before breakfast the next morning; to twenty-five by noontime, and reached thirty during the afternoon. Three families are represented and fifteen genera.

The rarest species in the leader's experience was the wall rue (*Asplenium Ruta-muraria*) which grew in small tufts in almost any rock exposure on the hotel property, almost within sight from the front porch itself. With it was the purple cliff brake and scattered walking ferns, neither in the best development, but frequent on almost any ledge. The other rock ferns were *Cystopteris fragilis, Asplenium Trichomanes, Polypodium vulgare,* and *Woodsia obtusa,* with *Asplenium platyneuron* standing up straight on grassy rocky banks.

On rocks and in deeper woods soil, *Dryopteris marginalis* was everywhere, easily the commonest fern seen, as it so often is. Ten other dryopterids were found. A few scattered plants of *D. intermedia* the florists' "fancy fern" were all of this species seen, mostly in upland situations. For *D. cristata, D. spinulosa,* and *D. Boottii,* a special trip to swampy woods was necessary. Three small swamps were visited, one near Lafayette and two near Sparta, and these swamps or lowland forms were found in all three. As a matter of record, it is hereby recorded that plants of these three and of *Osmunda regalis* were brought back to the Pines property and set out in appropriate situations along the small lake where they were not found naturally. The tallest and finest of all our northern shield ferns, *D. Goldiana,* was well represented in a small but vigorous colony.

The three species of the old Phegopteris section of the genus *D. phegopteris, D. hexagonoptera,* and *D. Dryopteris* were found in a few places in the hotel woodlands; also the marsh fern and the New York fern, *D. thelypteris* and *D. noveboracensis* respectively, although these were decidedly not common.

The maidenhair, *Adiantum,* was everywhere in the woods, forming frequenty and vigorous clumps. The brake, *Pteridium*

latiusculum, the sensitive fern (*Onoclea*) and the lady fern, probably only the upland form, (*Athyrium angustum*), were easily discovered. One clump of ostrich fern (*Matteuccia*) was seen just back of the hotel building, in a favorite habitat of black, mucky soil. With it, and elsewhere, was a good growth of the hay-scented fern (*Dennstaedtia*).

The Osmunda family was represented on the Pines property by two species, *O. cinnamomea,* and *O. Claytoniana,* but the lake shore was most favorable for these and *regalis* also, and all three should increase in number.

Only two members of the Ophioglossum family were found, two botrychiums. *B. virginianum* was everywhere through the woods, as scattered plants. After considerable search had proved unavailing, *B. matricariaefolium* was unexpectedly found by a well-trodden path in the woods to the number of some twenty scattered plants, varying from tiny specimens, barely above the leaves to others, several inches high. Wishful thinking might have added two more 'species' here; one of these 'matricaries' was slender, suggesting the Onondaga moonwort; two or three others were triangular, like *B. lanceolatum.* No adders' tongue (*Ophioglossum*) was found, although some search was made in boggy ground at the edge of the Sparta swamp.

The whole list of thirty is interesting, not only for the species represented, but for some unexpected omissions of rather common forms; the silver spleenwort; *Dryopteris Clintoniana, Cystopteris bulbifera,* and two ternate botrychiums;—these are very likely to be found in the course of a more extended search on the Pines property itself, while some nearby sphagnum bog should yield *Woodwardia virginica,* and the adder's tongue is almost certain to turn up where least expected. A final total of forty species is probably safe prediction for the general Branchville region.

The writer will be glad to send any readers interested a small assortment of fern literature, including as long as they last, a key to Botrychium and a sample copy of the American Fern Journal, now in its nineteenth volume. The Fern Society would be glad to join in promoting any future Branchville field meetings, if invited.

RALPH C. BENEDICT

BIRD CENSUS

Record of birds observed within a radius of one mile from the Pines Inn.

1. Green Heron
2. Spotted Sandpiper
3. Killdeer
4. Ring-necked Pheasant
5. Mourning Dove
6. Turkey Vulture
7. Black Vulture (?)
8. Cooper's Hawk
9. Sparrow Hawk
10. Long-eared Owl
11. Great Horned Owl
12. Yellow-billed Cuckoo
13. Black-billed Cuckoo
14. Kingfisher
15. Downy Woodpecker
16. Red-headed Woodpecker
17. Flicker
18. Whippoorwill
19. Nighthawk
20. Chimney Swift
21. Humming Bird
22. Kingbird
23. Crested Flycatcher
24. Phoebe
25. Olive-sided Flycatcher
26. Wood Pewee
27. Alder Flycatcher
28. Least Flycatcher
29. Blue Jay
30. American Crow
31. Starling
32. Bobolink
33. Cowbird
34. Red-winged Blackbird
35. Meadowlark
36. Orchard Oriole
37. Baltimore Oriole
38. Purple Grackle
39. English Sparrow
40. Vesper Sparrow
41. Goldfinch
42. Grasshopper Sparrow
43. White-throated Sparrow
44. Chipping Sparrow
45. Field Sparrow
46. Song Sparrow
47. Swamp Sparrow
48. Towhee
49. Rose-breasted Grossbeak
50. Indigo Bunting
51. Scarlet Tanager
52. Purple Martin
53. Barn Swallow
54. Rough-winged Swallow
55. Tree Swallow
56. Cedar Waxwing
57. Red-eyed Vireo
58. Warbling Vireo
59. Yellow-throated Vireo
60. Blue-headed Vireo
61. Black and White Warbler
62. Worm-eating Warbler
63. Blue-winged Warbler
64. Golden-winged Warbler
65. Tennessee Warbler
66. Parula Warbler
67. Yellow Warbler
68. Myrtle Warbler
69. Magnolia Warbler
70. Chestnut-sided Warbler
71. Bay-breasted Warbler
72. Black-poll Warbler

73. Blackburnian Warbler
74. Black-throated Green Warbler
75. Ovenbird
76. Northern Water Thrush
77. Louisiana Water Thrush
78. Maryland Yellow-Throat
79. Wilson Warbler
80. Canadian Warbler
81. Redstart
82. Catbird
83. Brown Thrasher
84. House Wren
85. White-breasted Nuthatch
86. Chickadee
87. Wood Thrush
88. Wilson's Thrush
89. Olive-backed Thrush
90. Robin
91. Bluebird

WM. GAVIN TAYLOR

Field Trip of June 1

Interesting plants of Pine Barren, moist woods, and Leather-leaf bog associations were seen by members of the Torrey Botanical Club on Saturday afternoon, June 1, on a field excursion led by Prof. M. A. Chrysler, of the Department of Botany, Rutgers University, from Spotswood, N.J.

In an area east of Spotswood, which is part of the "Pine Barren Island," shown by Witmer Stone, in his map of the state in his Flora of Southern New Jersey, the party found Prickly Pear Cactus, *Arenaria Caroliniana, Hudsonia tomentosa,* in clumps quite like those found on the seashore; the curious *Euphorbia Ipecacuanhae,* with its varied forms of leaves and *Lupinus perennis.*

Along the Manalapan river, both *Woodwardia virginica* and *areolata,* seen for the first time together by many of the party, were found; with the handsome flowered *Lyonia mariana,* or Stagger Bush, and *Leucothoe racemosa.* Opportunities were excellent for comparing *Pinus rigida* and *echinata.*

An unusual discovery was that of a hybrid oak, which had characters suggesting the white oak in the lobation of the leaves, or even such species as the Spanish, laurel or willow oaks, but smaller chestnut oak, or the blackjack oak, in their size. *Quercus alba, stellata, marilandica,* and *prinoides* all grew within fifty feet of this hybrid, and one might have several guesses as to its parents.

In wet woods and a Chamaedaphne swamp near Helmetta, which the party was able to reach quickly in automobiles provided

by Dr. Chrysler and his associates at the University, the party found *Chamaecyparis*, some of large size; *Sarracenia, Drosera rotundifolia, Magnolia virginiana, Disporum lanuginosum*, and *Nymphaea microphylla*.

Field Trip of June 16

Interesting Plants on the Appalachian Trail on Kittatiny Mountain, New Jersey

Three interesting plants were observed by a party including members of the Torrey Botanical Club, which was scouting for the location of the Appalachian Trail from Maine to Georgia, on Kittatiny Mountain, in Sussex County, New Jersey, on Sunday, June 16.

In an extensive rhododendron swamp, between two crests of the ridge, six miles southwest of Culver Gap, was found Red Spruce, which added another stand, in my knowledge, of this northern tree, which occurs in a few high cold swamps in the northern New Jersey and Orange County, New York, highlands. Another northern plant, common enough at low altitudes in northern New England and at high altitudes in the Catskills, but very rare in the vicinity of New York City, was *Cornus canadensis*, the Bunchberry, which has been reported before in Sussex County. It grew in dense shade of hemlocks and did not seem very thrifty, and was not blooming or showing any signs of bloom, but some of the stems had developed a second whorl of two or three leaves above the usual one of five or six. Apparently it was spreading, if at all, only by root growth.

Along the dirt road on the southeastern foot of the mountain for more than a mile, two to three miles south of the state highway from Branchville, past Culver Lake, through Culver Gap to Dingman's Ferry on the Delaware River, we found a plant which I had seen only once before, the Indian Physic, *Porteranthus trifoliatus*, the previous location being about ten miles northeast on the eastern foot of this ridge. It was numerous and thrifty with many blossoms, along the stone walls and fences beside the road. I note that Norman Taylor in his Flora of the vicinity of New York, says it is rare in the Highlands of the Hudson, but found in Sussex, Warren,

Hunterdon, Morris, Passaic and Bergen counties in New Jersey (probably the Bergen county record is an old one and it no longer exists there). He also says it is not found on Tertiary formations, is rare on the Cretaceous, and is scattered and local on the older formations, "most common on limestone." The two stations where I have found it are along the contact between the sandstones of the Kittatiny ridge and the limestones or limy shales of the valley eastward. It was very handsome and conspicuous in the occurrences found on June 16, suggesting at a little distance some kind of tall aster, and I remember that the first time I saw it, I was puzzled to decide its family relationship and it required considerable search in the manuals to run it down to the Rosaceae. The location is about seventy-five miles from New York, by the motor highway via Pompton, Butler, Newfoundland, Franklin, North Church, Branchville, to Culver Lake, then southwest on the dirt road along the eastern foot of the mountain, past Owassa Lake.

Raymond H. Torrey

Vagnera stellata Growing in Dune Sand

A fairly numerous and apparently thrifty colony of *Vagnera stellata,* (Smaller False Solomon's Seal) which is rare in the territory covered by the Torrey Botanical Club, in my own observation and is listed as "rare and local" in Norman Taylor's catalogue of plants of that territory, occurs in Sunken Meadow State Park, of the Long Island State Park system, on the north shore of the island, near King's Park. The station is interesting, not only because of the rarity of the plant, but because of the arid conditions. Both Britton and Gray speak of its habitat as in moist woods or other moist places, but this Long Island occurrence is in wind blown sand, about ten feet above the highest storm tides on the beach just below it. Back of the beach is a low, narrow ridge, partly a continuation of a moraine lobe of gravel and sand, from a higher mass to the west, and partly wind blown sand to a depth of two or three feet on the top of the ridge. Other plants are bayberry, beach plum, *Solidago maritima,* choke cherry, red cedar, post and white oaks, the oaks stunted and gnarled from their exposed position, bearing the brunt of west and north winds across Long Island Sound. The colony of *Vagnera stellata,* numbering perhaps fifty plants, of which

most were in bloom on May 25, grew in loose, white sand, in which rainfall must quickly sink beneath the surface. It may be a survival from a richer soil underneath, since covered with sand. I have seen it in the Highlands of the Hudson, on moist banks in woods, with *Vagnera racemosa,* with which it seemed in a natural habita, but its occurrence in this arid marine shorefront locality on Long Island seemed abnormal.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of March 20, 1929

This meeting was held at the Museum Building of The New York Botanical Garden. The meeting was called to order by President Denslow at 3:30 P.M.

Dr. Graves spoke of a proposed amendment to Subdivision 2 of Section 1425 of the Penal Law of the State of New York, which will add the small and large yellow lady's slippers, the showy lady's slipper, and the fringed and closed gentians and ferns to the list of plants to be protected in New York State; also the hart's tongue fern to be protected in Onondaga or Madison Counties. Members were urged to write to their senators to vote for the passage of this bill, and on the motion of Dr. Graves the club voted that the matter of notification of the members about this pending bill be left in the hands of the secretary.

"Notes on some New Marine Algae from Brazil" was the title of a paper by Dr. Marshall A. Howe of the New York Botanical Garden and Professor William Randolph Taylor of the University of Pennsylvania, presented by Doctor Howe in the absence of Professor Taylor. The algae in question were obtained by dredging off the coast of Brazil, mainly near Cabo Frio, in 1872, by the so-called Hassler Expedition. The Hassler was the name of a steamship belonging to the Coast Survey of the United States. Professor Louis Agassiz of Harvard University was invited to accompany the Hassler on a voyage from Boston to San Francisco by way of the Straits of Magellan. From his friends in Boston, he raised a fund of $20,000 for defraying the expenses of zoological collections on this voyage and organized a small party, one of whom was the Count Pourtalés, who had charge of the dredging operations. Dr. Thomas Hill, ex-president of Harvard University, was in charge of the chemical and physical work of the expedition and Agassiz's report states that "Dr. Hill made, also, a most valuable and admirably preserved collection of marine plants, gathered at every anchorage where time was allowed for landing." Some of the marine algae of the Hassler Expedition apparently unstudied hitherto, have recently been entrusted to Professor Taylor for naming, in which study Dr. Howe was invited to cooperate. Several

species that appear to be new to science were exhibited, together with photographs and detailed sketches of microscopic structure. It is expected that the paper will soon be published.

Mr. C. W. Emmons of Columbia University followed with an account of "The Cytology of *Cicinnobolus Cesatii* DeBary." *Cicinnobolus Cesatii* DeBary is one of the Fungi Imperfecti falling in the form family Sphaeropsideae, but presumably an Ascomycete and of special interest since it is parasitic on another Ascomycete. It is an intracellular parasite of the Powdery mildews, growing inside the hyphae of the latter and transforming mycelial hyphae, conidiophores, and ascocarps of the mildew into pycnidia which bear the spores of Cicinnobolus. It also invades cells and intercellular spaces of the host of the mildew. It was found abundantly infesting *Erysiphe Cichoracearum* on *Helianthus Tuberosus* and collections were made from a few other hosts. Good fixation was obtained with Flemming's weaker fixatives, and Flemming's triple stain gave characteristic staining reactions.

The parasite causes a granular degeneration of the host protoplasm.

The pycnidia vary in size and shape according to the organs in which they are built and the stage of development at which invasion occurred. The spores seem to be borne endogenously, nuclear divisions in the spore mother cell being followed by the pushing out of the cell wall into a projection which is then abstricted as a spore. This suggests spermatium formation, yet these are spores which apparently propagate the fungus. They germinate readily in distilled water and DeBary has observed that they infect hyphae and spores of mildew.

Late in the season rather thick-walled resting cells are formed in parenchymatous masses on the leaf surface, in the epidermal and trichome cells of the leaf, and in its intercellular spaces. Material collected in the spring shows perithecia imbedded in the dead leaf tissue. These are believed to be the sexual fruit structure of Cicinnobolus.

The fungus, although known commonly as an intracellular parasite within a fungus which is itself an obligate parasite, grows and fruits on glucose and peptone agar.

Forman T. McLean
Secretary

Meeting of April 2, 1929

This meeting was held at Columbia University with an attendance of twenty.

Dr. B. O. Dodge gave an illustrated talk on his fungus hybrids, and showed microscopic slides to further demonstrate them. His observations that sex differentiation and the segregation of conidial characters took place at different divisions of the mother cell caused lively comment and discussion.

After the meeting, refreshments were served by the committee.

Forman T. McLean
Secretary

Meeting of April 17, 1929

This meeting was held at the Museum Building of The New York Botanical Garden. The meeting was called to order by President Denslow at 3:30 P.M.

Dr. N. L. Britton, Director-in-Chief of The New York Botanical Garden, spoke on "Botanical Studies in Porto Rico" with especial reference to studies carried on there during the past winter, with Mrs. Britton. His narrative will be published in Journal of The New York Botanical Garden" for May, 1929.

Dr. P. W. Zimmerman of the Boyce Thompson Institute, Yonkers, New York, spoke on "Special Phases of Vegetative Plant Propogation."

Vegetative propagation is the multiplication of plants by means of vegetative parts such as stems, leaves and roots. The most common method is to place a piece of stem in moist sand and keep it supplied with water until new roots are produced. The rooted cutting is then transferred to soil to establish a new plant of the same type as that from which the cutting was taken. This eliminates variation such as is characteristic for plants originating from seed. Hybrids do not come true from seed, but when propagated vegetatively the new individuals have all the characteristics of the mother plant.

The problem is that not all plant types can be grown from

cuttings and our best hybrids are likely to be the stubborn ones. Often ten per cent of a collection of cuttings of a certain variety will root and perhaps 90 per cent of another variety, but seldom do 100 per cent of a large collection respond according to our wishes.

In a study of the effect of factors governing response of holly *(Ilex opaca)* we found many variables. First of all not all the cuttings of a collection from any one tree will form roots. A 60 to 70 per cent response is common for the best trees. Second, when we compare one tree with another there appears to be a regular variation for each tree. Whether the variation is due to inherent causes of whether the possibilities for selecting uniform cuttings is greater in one case than in another is not known. The fact is that they vary.

The best time to propagate holly is from August to January 1 in this section of the country. Collections coming in after January 1 have often shown frost injury and have done poorly. Current growth about 4 to 5 inches in length is better than other age wood though good results may be had with two-year-old wood attached where there is a short growth of current year stem. Even four- or five-year-old stems may be used but the percentage of rooting will be less with such material.

Cuttings of evergreen holly must have a few leaves to assist in root production. Stems of material taken in October, 1928, were very low in starch but on December 15, when the cuttings were rooting an abundance of starch was found. At the same time starch is increasing reducing sugars decrease so that the end of the experiments the amount of sugar is much less than at the beginning.

Extra light from 1,000 watt nitrogen bulbs for 6 hours each night while the cuttings were in the medium greatly increased root growth and in some varieties increased the percentage of rooting. There was an indication that the longer the illumination period, the better for cuttings. Care must be taken, however, to prevent drying since the electric lights have a tendency to lower the humidity of the air over the cuttings.

Temperature best for rooting holly cuttings ranges from 65° to 75° F. Some rooting can be obtained at higher or lower tempera-

tures but best results can be had at approximately 70°F. At the right temperature rooting begins after 3 weeks but for practical purposes the cuttings should be left in the medium for three months. One of the greatest problems is to prevent drying since holly transpires water very rapidly. Newly potted plants should be kept in high humidity houses or cases for two or three weeks before being exposed to dry air.

Plants grown from cuttings taken in December usually make good shoots in April. They often flower during the first season and if properly handled the berries resulting will ripen at Christmas time. Since holly is dioecious it is necessary to propagate both types at the same time so that the staminate flowers are ready when the pistillate plants are flowering. Hand pollination is necessary if the plants are in a greenhouse.

Other results shown concerned the effects of extra light on lilac, Taxus, Andromeda, Azalea and Camelia. All of these responded well to extra illumination. Grape cuttings with leaves were compared with cuttings from which all buds had been removed. The results were that budless cuttings grew succulent roots of large diameter and without secondary roots, while the leafy cuttings had many fiberous roots. The picture showed a striking difference and it was suggested that possibily some special substance was made in the leaves which controls the type of roots produced.

Forman T. McLean
Secretary

Meeting of May 7, 1929

This meeting was held at the American Museum of Natural History. The meeting was called to order by President Denslow at 8:20 p.m.

The following new members were unanimously elected: Miss Camilla Passow, 782 East 175th Street, Bronx, New York and Mr. W. S. Bourn, Boyce Thompson Institute, Yonkers, New York.

Mr. Norman Taylor gave a very interesting account of his recent botanical work in Brazil, and illustrated it both by lantern

slides and with material which he had gathered during the trip.

The meeting was adjourned at 9:30 P.M., after which refreshments were served by the entertainment committee.

FORMAN T. MCLEAN
Secretary

NEWS NOTES

Dr. Nathaniel Lord Britton has resigned as director of the New York Botanical Garden and as secretary of the board of managers in order to devote more time to private research, especially on the vegetation of Porto Rico and the Virgin Islands. Dr. Britton has served as director-in-chief of the garden since it was organized in 1896, and was elected secretary of the board of manager two years before the garden was actually started. The growth and development of the garden is largely his work. Incidentally he has been interested in the beautification of the city and has helped in plans for planting and caring for the city trees. In connection with his work in the garden Dr. Britton has made more than twenty trips to the West Indies, collecting hundreds of thousands of specimens for the herbarium of the garden.

Dr. Elmer D. Merrill, director of the Botanical Garden and of the experiment station of the University of California, is to succeed Dr. Britton as director of the Garden.

Dr. Leigh H. Pennington, professor of forest botany at the New York State College of Forestry, Syracuse, died suddenly in Washington on April 23, at the age of fifty-one years. He was on sabbatical leave and had been employed by the government as expert forest pathologist in the study of the white pine blister rust. He had taught at the College of Forestry for fourteen years. (Science)

Dr. A. S. Hitchcock, of the U. S. Department of Agriculture, left for South Africa on June 8. He will attend, by invitation, the South African Association for the Advancement of Science at Cape Town and Pretoria and will give a paper on the "Relation of Grasses to Man." Later he will spend about a month collecting grasses on the tableland about Nairobi. He hopes to obtain

temperate and Alpine species in Mt. Kilmanjaro. The return to London will be through the Red Sea, with brief stops in Egypt and Palestine. (Science)

Dr. John S. Karling, Professor of Botany at Columbia University and Physiologist of The Tropical Plant Research Foundation, Washington, D.C., departed from New York for British Honduras the early part of June to continue experimental work on chicle production. This is the third expedition Dr. Karling has undertaken to the tropics for the Plant Research Foundation in their efforts to place chicle production on a plantation basis for the American chewing gun companies.

A shipment of insects parasitic on the prickly pear was recently made from Uvalde, Texas, to Australia. The 35 cases weighed 6,894 pounds. With the insects there were joints of the prickly pear for food on the long journey. Thousands of acres of cactus-infested land in Australia have already been reclaimed by the aid of these insects.

THE TORREY BOTANICAL CLUB

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Vol. 29 September-October No. 5

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

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BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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THE TORREY BOTANICAL CLUB

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Meetings twice each month from October to May, inclusive: the first Tuesday at 8:15 P.M., at the American Museum of Natural History or at Columbia University; the third Wednesday at 3:30 P.M., in the Museum Building of the New York Botanical Garden, Bronx Park, New York City.

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TORREYA

Vol. 29 September-October No. 5

Cleistogamy In Poa Chapmaniana

Paul Weatherwax[1]

It is usually difficult for a beginner in the study of grasses to distinguish between *Poa annua* L. and *Poa chapmaniana* Scribner. As in so many other instances, the differences between the two are clear after a few specimens of each have been seen, but it is difficult to visualize the characteristics from the descriptions. In the manuals in general use in the eastern part of the United States, and in many of the state floras, the keys use the presence or absence of cobwebby hairs at the base of the lemma and the prominence of the intermediate nerves of the lemma as distinguishing characters; but both prove confusing in practice, and the additional characterizations given in the descriptions are little more illuminating.

Some time ago it was pointed out to the writer by C. C. Deam that the anthers of his specimens of *P. chapmaniana* were only 0.2 mm. long, while other Indiana species of Poa had anthers much longer than this. Further investigation following this lead, showed that the difference between the two conditions is much more fundamental than merely length of anther. *Poa chapmaniana* is completely cleistogamous.

Differences between the spikelets of the two species may be seen in Figures 1 to 4. The flower of *P. annua* has large feathery stigmas, and three well-developed anthers, (Figs. 1 and 2.) at least 1 mm. long, and exserted on long, slender filaments at anthesis. Pollination is doubtless accomplished by contact and by the wind. The flower of *P. chapmaniana* has small, poorly developed stigmas, and a single stamen, whose anther (Fig. 3) is only 0.1 to 0.2 mm. long and produces only about 16 to 24 pollen grains. The floret does not open and self-pollination within the floret necessarily occurs. The

[1] Publication No. 37 of the Waterman Institute for Scientific Research, Indiana University.

anther is in contact with the stigma at the time of flowering and the dried remains of the two may be found together at tip of the mature seed.

Poa annua is common in many parts of Europe, but is supposed to have been introduced into the United States in recent times. *Poa chapmaniana* is thought to be a native of the United States. Practically nothing of the phylogenetic history of either is known, but the similarity of the two suggests

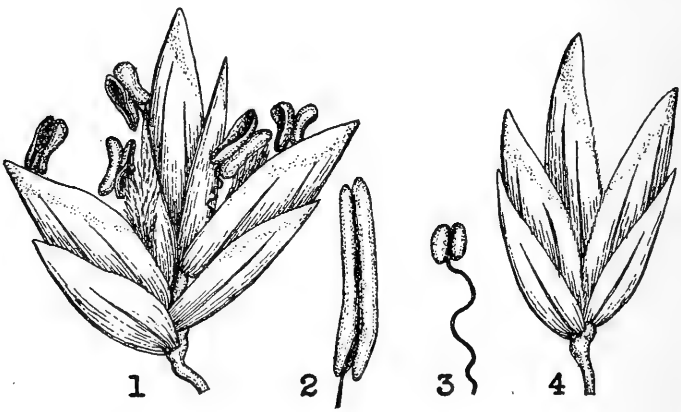


Fig. 1, spikelet, and Fig. 2, stamen of *Poa annua*. Fig. 3, stamen, and Fig. 4, spikelet, of *Poa chapmaniana*. Magnification: spikelets, x 12½; stamens, x 25.

close relationship. It is probably not too rash to formulate the hypothesis that cleistogamy has here been a mechanism of evolution. In thinking of the formation of a new species from a pre-existing stock by any kind of mutative or selective process, we recognize the importance of barriers which prevent the blending of the two strains by hybridization. These barriers may be environmental, or they may take the form of anatomical or physical peculiarities of the organism itself. If we regard *P. chapmaniana* as having arisen as an offshoot from *P. annua* we have in cleistogamy a barrier more effective than a mountain range or a sea in keeping the new species from hybridizing with its parent.

Indiana University
Bloomington, Ind.

Two Undescribed Types of Rock Outcrop Vegetation in Georgia

Roland M. Harper

For over fifty years marble has been quarried in a narrow belt extending with a few ramifications and interruptions from a point about fifty miles north of Atlanta northward into North Carolina, in a region difficult to classify geographically, which may be regarded as partly in the Blue Ridge and partly in the Piedmont region. This belt is many miles from any other calcareous rock, and is bordered on both sides by gneisses, schists, etc., characteristic of the Appalachian region.[1] It was therefore naturally to be expected that on and around the marble outcrops there would be some plants not found elsewhere in that part of the state; but in spite of the accessibility of the marble area since the building of a railroad near it about forty years ago, apparently no botanist had taken the trouble to investigate it until the time here mentioned.

In October, 1928, on returning from a trip to the mountains farther north, I stopped for part of a day at Tate, in Pickens County, the nearest railroad station to the principal quarries. I could spare only one afternoon for the investigation, it was 2 P.M. when I got off the train, and I had to walk about two miles east, to Marble Hill, to find a suitable outcrop, and wade a creek to get to it. My notes therefore are not very full, but they will serve to attract attention to this vegetation, and perhaps lead to some interesting discoveries later.

The marble is partly in the bottom of a narrow valley (that of Long Swamp Creek, and its eastern fork), and partly on the adjacent slopes. That in the bottom of the valley is covered with rich red residual soil, which may have had some interesting plants on it originally, but is now mostly cleared and cultivated, as well as excavated in several places to get at the marble beneath. The adjacent bluffs have been quarried extensively too, but I managed to find a few places where

[1] For a recent geological description of the most important marble area see W. S. Bayley, Geology of the Tate Quadrangle, Georgia. Geol. Surv. Ga., Bull. 43. ix + 170 pp., 22 plates, 2 folded maps. 1928. It is also described in less detail by S. W. McCallie (the present state geologist) in the first bulletin of the same office, published in 1894 and revised in 1907.

approximately natural conditions still existed. The bottom of the valley is about 1000 feet above sea-level, and the bluff at Marble Hill rises about 500 feet higher, but the marble seems to be all within about 100 feet (vertically) of the valley bottom.

The following plant list is made up of plants seen on October 17th on the lower part of the bluff, which faces northward and is pretty well covered with rich residual soil and humus, except where the marble ledges protrude. The line of contact between the marble and the non-calcareous rock above it was rather obscure, but I determined it approximately by means of the vegetation. The vegetation had been damaged a little by human agencies, but weeds are excluded from the following list. In the short time available it was not possible to examine a large enough area to determine the relative abundance of the species very well, and the following sequence is only tentative. Trees, shrubs, vines, etc., are separated, as has been my custom for many years.

TREES

Tilia sp.
Liriodendron Tulipifera
Fraxinus americana
Quercus borealis maxima?
Ulmus fulva
Quercus Michauxii?
Juglans nigra

SMALL TREES

Morus rubra
Cercis canadensis
Halesia carolina

VINES

Rhus radicans

SHRUBS

Benzoin aestivale
Asimina triloba
Philadelphus sp.
Staphylea trifolia
Hydrangea arborescens
Adelia ligustrina?
Corylus sp.

HERBS

Heuchera macrorhiza
Solidago flexicaulis
Adiantum pedatum
Aster cordifolius
Eupatorium ageratoides
Adicea pumila
Collinsonia anisata
Aquilegia canadensis
Polystichum acrostichoides

None of the species above listed are confined to calcareous rocks or soils, but several of them are more abundant in such soils than in acid soils. Some are very characteristic of the shale bluffs along the Warrior River in Tuscaloosa County, Alabama, described by the writer a few years ago.[2]

[2] Jour. Elisha Mitchell Sci. Soc. 37: 153–160, pl. 28. April, 1922.

If this place could be visited in spring doubtless several additional species could be found; and if there are any southward-facing bluffs of marble they should have a rather different vegetation. It would be very desirable to make additional explorations in the neighborhood before the quarrymen have extended their operations much further, for every marble outcrop is liable to exploitation sooner or later, and their aggregate area is very small.

Two other plants seen near Tate deserve mention here, though they have little or nothing to do with the marble outcrops. In dry pine woods (*Pinus echinata* and *P. Taeda*) about half way between the railroad station and the valley of Long Swamp Creek, one of the commonest plants at the time of my visit was a form of *Coreopsis Oemleri*. That species usually has opposite leaves three-parted to the base, giving an appearance of whorls of six lanceolate leaves. But at this particular locality many of the plants had the uppermost leaves, and sometimes most of the leaves, reduced to a single lobe. (A different variety of the same species will be mentioned farther on.) Associated with it was *Aster surculosus*, a species I have not met many times. Specimens of both were collected, and have been distributed to a few herbaria.

The other kind of rock outcrop to be described is at the inner edge of the coastal plain, not far from the eastern border of the state. In traveling on the Georgia Railroad in the early years of the present century I had several times noticed in cuts and elsewhere in the vicinity of Harlem, in Columbia County, some rock of a peculiar purplish hue. As this is very close to the fall line, and as rock of very similar color and undoubted Triassic age occurs along the fall line (as well as farther inland) in North Carolina, I at first imagined this to be an unrecorded outlier of Triassic (which is otherwise unknown in Georgia). But inquiry among geologists and examination of geological literature threw no light on the subject.

There the matter rested for over twenty years, until on visits to Harlem in June, 1927, August, 1928, and June, 1929, I had opportunity to look into it more closely. The purple rock is evidently one of the coastal plain deposits, for one must go north from Harlem a mile or so before encountering fragments of crystalline rock mixed with the unconsolidated sands

and clays, and perhaps twice that distance to find soils unquestionably residual from ancient rocks. A hill about a mile and a half north of Harlem is capped with the purple rock but has angular pieces of quartzite, some about a foot long, on its southern slopes and even farther south. The rock in question occurs on comparatively level uplands, and does not seem to form continuous ledges of any considerable extent, but is a sort of surface crust, commonly only a foot or two in thickness and broken up into fragments ranging from about the size of a pea to that of a man's head, and in some places covering the ground so thickly as to prevent plowing. It is often mottled with white, in much the same way as many of the non-calcareous clays of the coastal plain, and it is probably only an indurated clay. The larger pieces have been used locally for curbing and foundations, and there is one handsome modern house in Harlem with outer walls built entirely of this rock (perhaps the only one of its kind in the world), and another with porch columns constructed of it. Smaller fragments are used for road material.

In some respects it strongly resembles the Altamaha Grit, which characterizes one of the regions farther down in the coastal plain,[3] but that forms thick ledges, usually on hillsides or near streams, and is more brownish in color, much like pine bark. All the purple rock that I have seen is within a mile or two of Harlem, in the counties of Columbia and McDuffie; but of course there may be other occurrences of it at a greater distance. Its area seems to correspond approximately with that of the "Greenville gravelly loam"[4] described by C. N. Mooney and A. E. Taylor in their soil survey of Columbia County, published by the U. S. Bureau of Soils in 1912. The areas of that soil there mapped are all within two or three miles of Harlem, and their aggregate extent in the county is put at 1600 acres.

The vegetation on the purple rock is much less unique than that on the Altmaha Grit, and shows nothing remarkable except in the abundance of certain species that are scarcer elsewhere and the variation of some others from their typical forms,

[3] See Torreya 4: 140; 6: 242; 11; 97.

[4] This designation is rather misleading, for the purple rock seems to have no gravel in it, and it has little in common with any rock or soil near Greenville, Ala. (from which that soil series name seems to have been derived).

but it is worth putting on record. From rather fragmentary observations on three different days in consecutive years I have made up the following plant list, which arranges the species in each size class in approximate order of abundance, as before, and omits those noted only once.

TREES

Pinus Taeda
Pinus echinata
Pinus palustris
Hicoria alba
Quercus falcata
Liquidambar Styraciflua

SMALL TREES

Quercus marylandica
Cornus florida
Quercus stellata

VINES

Vitis rotundifolia

SHRUBS

Clinopodium georgianum
Polycodium caesium?
Rhus copallina
Crataegus uniflora?
Rhus Toxicodendron
Ceanothus americanus
Vaccinium pennsylvanicum?

HERBS

Cracca virginiana
Coreopsis Oemleri
Andropogon scoparius
Eupatorium album
Sericocarpus asteroides
Silphium compositum
Pteridium aquilinum
Laciniaria graminifolia
Solidago odora
Erigeron ramosus
Polygala Curtissii
Vernonia oligophylla
Nolina georgiana
Lespedeza repens
Allium mutabile?
Chrysopsis graminifolia

Most of the specimens of *Pinus palustris* were rather stunted, as if the environment did not suit them very well; but there may have once been larger ones, that have fallen a prey to lumbermen. The *Climopodium*[5] is more abundant there than I have seen it in any other equal area. (It seems to have been discovered by Michaux near Augusta, about 25 miles away.) Most species of *Polycodium* have fruit that is rather bitter and not very palatable, but the one on the purple rock had the largest and finest fruit (ripe in late August) that I ever saw in that genus, with the possible exception of a taller one that grows in sandy hammocks in Wakulla County, Florida. The species in this genus are not very sharply defined, and this

[5] Formerly called *C. carolinianum*. For the reasons why that name was untenable see Bull. Torrey Bot. Club 33: 243–245. 1906.

one may not be typical *P. caesium*, which is common on sand-hills in the coastal plain of Georgia and the Carolinas.

The *Crataegus* is a shrubby one, with the aspect of *C. uniflora*, but its fruit (in August) is redder than I have been accustomed to in that usually easily identified species. Most of the specimens of *Coreopsis Oemleri* have very narrow, almost linear, leaf-segments (var. *rigida*?) and occasionally (in McDuffie County) the middle segment is divided near the the middle into three, making an opposite extreme from the form in Pickens County above mentioned, and indicating an approach to *C. delphinifolia* or *C. verticillata* (neither of which is known in that neighborhood, however).

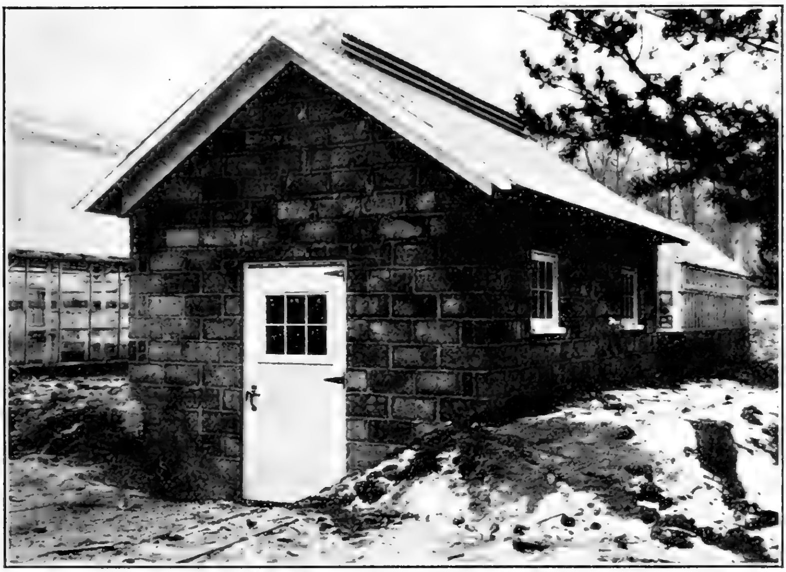
Erigeron ramosus, which is an abundant weed in dry old fields in the southeastern states, may have invaded the rock areas only since some of the pine trees were cut out.

Athens, Georgia.

An experimental Mushroom House

Illo Hein

The diversity in the practices of the commercial mushroom growers has led to a demand for experimental work to determine the most satisfactory methods for the production of maximum yields. The Department of Botany at The Pennsylvania State College is undertaking investigations in mushroom culture and has recently constructed an experimental mushroom house.



The handling of the compost, (numbers and methods of turnings required, amounts of water to be added, etc) optimum temperatures of the houses,-ventilation, light, size, number per unit area, and depth of planting, of the spawn piece, depth of the substrate in the bed, possible addition of nutritional substances, (artificial fertilizers) control of diseases, breeding of improved strains and numerous other questions under these heads have made it highly desirable to construct an experimental mushroom plant where appropriate tests can be made.

In working out plans for such a plant no very special construction appeared necessary at this stage other than that convenient beds, ventilation, suitable temperature, and moisture

control be provided. The experimental house just completed is built of hollow, concrete, cinder blocks. Cinder blocks because of their demonstrated low temperature transmission coefficient[1] (Hechler, 1927) and moderate cost appeared to be adequate for the type of house required.

The house is $12 \times 20 \times 10$ feet high to the eaves, has gable roof with open ventilator running the full length of the ridge pole. A wooden ceiling insulated with a 6″ layer of sawdust is provided with automatic sectional dampers which can be independently controlled. The ceiling ventilator runs through the median line, the full length of the house and is directly under the ridge pole opening. Five double, six-light, sash windows have been installed for convenient lighting during operations and for possible experiments concerning the effect of light, etc.

Three tiers of beds each 3 feet wide, 30″ apart from bottom of bottom run the length of the house. The construction of the beds is such that they or parts of them can be removed tor purposes of cleaning, disinfecting and to make room for apparatus which may be installed from time to time for certain experiments. Heat is provided by two 2″ steam pipes 2 feet from the ground and running completely around and against the walls of the house. A steam valve permits the emission of live steam for the purpose of raising the vapor pressure of the atmosphere. Running water is provided and electric connections for apparatus and illumination have been installed.

This is the first house of its kind constructed for purely experimental purposes.

Department of Botany
State College
Pennsylvania

[1] Hechler, F. G. Insulation of Fruit Storage Houses. Agricultural Engineering. 1927 Volume 8, No. 9, pages 249–251.

Minor Successions from the Cladonia Mat in Sandy Upland Soil in Northern Michigan

CEDRIC L. PORTER AND MARJORIE L. WOOLLETT

During the course of study of the effect of Cladonia and moss mats upon the germination and establishment of seedlings in the sandy pineland aspen areas at the University of Michigan Biological Station in Cheboygan County, Michigan, during 1927, certain successions were noticed which are here dealt with separately.

The Cladonia areas undergo distinct succession stages and represent minor associations in themselves. The succession is not always the same, but generally follows one of two courses. (a) If the area be open and unshaded by surrounding trees, the Cladonia will survive for a long period of time. Invasion by other plants is limited to those reproducing by rootstocks, or by a few seedlings which have become established in the cracks between the mounds or cushions of Cladonia. In the area studied these invading plants from rootstocks were limited to *Pteris aquilina*, *Diervilla lonicera*, and *Vaccinium angustifolium*. The seedlings found were chiefly of *Melampyrum lineare*, and occasional seedlings of *Aster laevis* and *Aster macrophyllus*. These plants, chiefly the Pteris, slowly drive out the Cladonia by producing shade, and other less tolerant seedlings become established under them. Late stages in this succession show such plants as *Oryzopsis asperifolia*, *Solidago hispida*, *Aster laevis*, *Carex umbellata*, and *Gaultheria procumbens* well established along with the Pteris and Vaccinium. Thus the Cladonia is gradually broken up and disintegrated, allowing any available seeds to germinate and become established where formerly they would not have had a chance.

(b) The other type of succession is found in areas where the soil is richer and a little more shaded. In the pure beds of *Cladonia rangiferina* come up innumerable moss plants, mostly of *Polytrichum juniperinum* and *Ceratodon purpureus*. During a wet spell, the spores, lighting on the damp spongy Cladonia find ideal conditions for germination. The protonema grows all through the Cladonia, contact with the soil being unnecessary for their development. From this come up innumerable leafy moss plants which soon begin to crowd out the Cladonia.

Periods of drought have little ill effect on the establishment of the mosses, since they are extremely xerophytic forms, used to drying out without injury.

Late stages in this succession show seedlings well established in the moss and by their shade killing off the mosses. The species represented by the seedlings are in general the same as were found in the other type of succession.

University of Michigan Biological Station.
Cheboygan, Mich.

A New Phlox from Texas

Phlox wilcoxiana sp. nov.

E. R. Bogusch

The writer's attention was first directed to this plant four years ago while collecting in the coastal region of Texas. The deep red color of the flower was so intense and abundant that a number of plants were collected for closer study. At first it it was believed that the deeper coloration was due to soil factors entirely, and seed was collected for both this species and of *Philox drummondii* Hooker, which is the name the plant has been passing under. When the seeds of one locality were planted in the habitat of the other, no changes in color or structure were evident and four years' observation has revealed no difference of the offspring that have come from self-seeding.

The new phlox differs from *Phlox drummondii* in the deep red color of the corolla, the larger size of the plant, the much longer calyx, and in the arrangement of the leaves. *Phlox wilcoxiana* as a whole is much more viscid, and specimens that have been placed between sheets shed considerable quantities of sand that adheres to the living plant. The more villous stem and leaves approaches that of *Phlox villosissima* (A. Gray) Small, but the latter is a smaller plant with a somewhat larger corolla limb. Both *Phlox drummondii* and *Phlox villosissima* dry with lavender or pink corollas, while that of *Phlox wilcoxiana* invariably dries a deep maroon-red. White flowered forms have been observed, but they are few.

The specific name has been taken from the geologic formation upon which the species is found most abundantly. The distribution is most abundant in Gonzales, Caldwell, Bastrop, Atascosa, and adjoining counties, but it is expected to occur over a greater part of the coastal region, and it has never been reported from any other stations. A description of the characters follows.

Annual, villous, viscid plants. Stems 1–5 dm. tall, sometimes branched at the base, usually erect: lower leaves opposite, oblanceolate with narrowed bases, petioled, 2.5–4 cm. long; upper leaves lanceolate with obtuse, sometimes clasping, bases, alternate, 2-4.5 cm. long, 4-8 mm. wide: calyx 10-12 mm. long

the lobes usually as long as the tube or slightly surpassing, subulate, ciliate: corolla tube villous, much surpassing the calyx tube, deep red becoming darker upon drying; limb 1.8–2.2 cm. across, the lobes abruptly pointed; capsule 5 mm. long: seeds 3 mm. long, brown or black, rugose.

The type, Bogusch & Molby 2727, has been deposited in the Herbarium of the University of Illinois.

University of Illinois
Urbana, Illinois

Two Undescribed Species of Hypericum from South America

H. A. Gleason

Hypericum andinum n. sp. Section *Brathys*, subsection *Eubrathys*: stems several from a woody perennial root, woody, erect, strict or virgately branched above, 1–3 dm. high, irregularly ribbed; internodes mostly 3–4 mm. long; leaves stiff, more or less involute, nearly erect, ascending, or outwardly curved, linear, 5–7 mm. long, acerose, 1-nerved, deeply and conspicuously pitted on the lower side, deciduous from the older stems, where the bases persist as minute projections; flowers numerous, solitary at the ends of the branches or more commonly in clusters of 2–4 terminating short branches; sepals oblong-lanceolate, conspicuously punctate, 4–5 mm. long, 1.3–1.7 mm. wide; petals narrowly obovate, 7–9 mm. long by half as wide; stamens 20–25, 3–4.5 mm. long, all separate; ovary ovoid, 2.8 mm. long, 1-celled with 3 parietal placentae; styles 3, separate, half as long as the ovary.

Type, *Bang 1026*, collected near snow-line, Mt. Tunare, Bolivia, 1891, and deposited in the herbarium of the New York Botanical Garden; other specimens are *Buchtien 57*, *Williams 851 and 1526*, *Rusby 1350*, and *Mandon 790* from Bolivia, and *Macbride 4884* from Peru. The species is related to *H. struthiolaefolium* Juss., from which it differs in its smaller flowers with much fewer stamens and shorter leaves. Its slender stems, abruptly branched at the top into a few-flowered inflorescence, give it a very characteristic habit.

Hypericum punense n. sp. Section *Brathys*, subsection *Spachium*: perennial from a woody root; stems densely tufted and spreading, 3–8 cm. long, the internodes 2–5 mm. long, prominently flattened and bicarinate, punctate; leaves crowded, usually imbricate, spreading, firm, narrowly oblong, 4–6 mm. long, 1–2 mm. wide, obtuse, narrowed toward the base, 1-nerved, heavily and irregularly black-punctate; flowers mostly in terminal cymes of three, occasionally also in the upper axils; pedicels of the terminal flowers 3–5 mm. long, of the lateral flowers shorter; sepals dimorphic, the outer three oblong, about 1 by 3.5 mm., the inner two obovate, about 2 by 4 mm.; petals narrowly obovate, about 5 mm. long; stamens 10, separate, about 3 mm. long; ovary ovoid, 1.5 mm. long; styles 3, separate, 1.5 mm. long.

Type, *Pennell 13,446*, collected on rocky siliceous slopes, Arauco, Dept. Puno, Peru, alt. 4100–4300m., 21 Apr. 1925,

and deposited in the herbarium of the New York Botanical Garden. *Pennell 13,764*, from Colquipata, Dept. Cusco, is the same. The plant resembles the prostrate form of *H. uliginosum* HBK. in its general habit, but is smaller in size and is further distinguished by its styles as long as the ovary, the strongly dimorphic sepals, the heavy punctation, and the flattened stems.

New York Botanical Garden

What Will be the Fate of the Queens Ponds?

A report of the New York Microscopical Society—Torrey Botanical Club field meeting of June 30, at Queens Pond, by John M. Sheridan, Secretary of the Microscopical Society, suggests that something ought to be done by the scientific societies of the city and others interested in the conservation of its remaining natural scenery, for the retention of the natural conditions in the moraine area north of Queens and Bellaire which has lately been taken by the City of New York, for a new park.

"This old favorite pond of ours was lower in water than I have ever seen it," writes Mr. Sheridan, "but still teems with most interesting forms of insect and plant life. A great many flying insects were noted, and I observed many forms of dragon flies especially. Many birds also made the trip still more delightful. On the way home we hiked to the pond in Hollis.

A deep kettle hole pond, 60 feet below surrounding moraine, in Hillside Park, an abandoned automobile in the edge of the water.

We found it with plenty of water but in an awful state of pollution owing to the rubbish of old water boilers, and several discarded autos. A shame that such a bright, pleasing stretch of water in a beautiful setting of trees should be allowed to fill up with junk. Any student of pond life will be well repaid by visiting the pond in Queens Village."

Kettle hole pond in moraine near 212th Street, in area taken by the city for Hillside Park. The water is covered with the common Bladderwort in bloom.

I presume Mr. Sheridan refers first to the collection of beautiful little kettle hole ponds, just back of the front of the moraine, in the area, to the west of 212th street as it is extended up hill from Hillside avenue, which has been taken over by the city. One of these has been known to botanists as Potamogeton Pond, from the occurrence of *Potamogeton natans*, the floating pondweed, there. Its shores, as I saw them about the same time as Mr. Sheridan's visit, were defaced by abandoned automobiles. The city has only recently

taken title and has done no improvement work, and it is a convenient resort for anyone who has an old car whose presence is embarrassing and which he wishes to discard painlessly. But on another of this group of kettle hole ponds, to the north, I saw a beautiful sight, thousands of the bright yellow, bonnet-shaped blooms of the Common Bladderwort, in prime condition about July 1. Boy Scouts still camp in the woods about these ponds, and the timber is one of the best remaining natural stands in the Greater City. Much of it has been cut to clear new streets for a real estate development east of the park, and the logs are being sawed at a sawmill nearby; a strange sight to see in the city and probably the only sawmill operating in the field in Greater New York.

Those who know and love these little ponds, which are typical of hundreds of others along the moraines of Long Island, but are the nearest to the city in a fairly natural state, wonder what is to become of them when the city begins to develop this new park. Will the steam shovel and grader attack their beautiful smooth outlines, made by the Glacial Period, and conventionalize them? Will the splendid trees be cut to give place to a golf course? There was never a better landscape architect than the ice sheets of the Pleistocene, and not a thing needs to be done to the existing contours to preserve beauty in the new park. Cannot the scientific societies and lovers of natural scenery persuade the Queens borough and the city park authorities to go easy on this pleasant terrain and to save a few of these little ponds (after removing the discarded automobiles and other junk) as they are, as preserves for plants, insects, microscopic water life and birds?

RAYMOND H. TORREY

BOOK REVIEW

Spring Flowers[1]

These eight talks given by Dr. Jennings in the series broadcasted by KDKA from the University of Pittsburg were designed as an appeal to get out into the open and watch with understanding the development of plant life. Beginning with Early April, a talk on the first flowers of the season, their habits and habitats, there follow talks on What is a Flower, How to Study Trees and Flowers, Protecting the Wild Flowers, Flowers of Early May, The Cultivation of Spring Flowers, Flowers of the Woods, Flowers of Field and Garden, The talks are simple and definite with an interest for nature lovers and, we hope, also for all those who go out to the woods and fields. It is to be hoped that many listened in to the talks and learned more to appreciate and care for our native plants, whose conservation is so greatly needed. We feel sure that Dr. Jennings talks must have been interesting and stimulating to his "radio audience" and that the talks in booklet form will be of interest to nature lovers everywhere.

George T. Hastings

[1] Trees and Flowers of Spring, O. E. Jennings, Univerity of Pittsburg Radio Publication No. 52. 104 pp. June, 1929. 60 cents.

FIELD TRIPS

Trip of June 9 to Rockaway Beach

Seventeen members and guests of the club enjoyed the walk along Rockaway Beach on June 9. The sand dunes contained many interesting plants particularly *Hudsonia* in bloom, and *Artemisia*, a variety of color forms of wild roses from snow white to deep crimson, and abundant beach goldenrod, not in bloom. One of the party reported seeing a hog nose viper. We also happened on a nest of plover on the ground among the grasses on the dune, containing three eggs.

There was only one small annoyance, which was that we were prevented by a sentry from walking along the beach in front of the Naval Reservation at Fort Tilden, the aviation station. If this walk is held next year, as I hope it will be, a pass can be obtained beforehand. About 5 o'clock most of the

party took the Breezy Point ferry for Sheepshead Bay where they had dinner and so to the subway and home.

(The survival or return of the hognose viper, *Heterodon platyrhinus*, and the plover on this strand is interesting, considering the intensive building there in recent years, but probably the naval reservation area still maintains a limited preserve for such species.-R.H.T.)

Zaida Nicholson

Field Meeting of Sunday August 18

The party on the field meeting of August 18, in the northeastern part of the Harriman-Bear Mountain State Park, numbered twenty-eight, including about a dozen of the nature councillors in the Park camps, and members of the New York Microscopical Society, the New York Mountain Club, the Green Mountain Club, the Brooklyn Entomological Society, and others. The route was from Bear Mountain Inn, through the Nature Museum and trails, across Popolopen Creek, and by road and trail over Crown Ridge to Torne Pond, around the pond, out to the Forest of Dean Road and by Timp-Torne Trail across Popolopen Creek, and by the Popolopen Gorge Road back to Bear Mountain, about nine miles.

Among a number of interesting species seen, perhaps the most unusual was the Japanese Knotweed, *Pleuropterus Zuccarinii*, which was found in abundance and evidently well established about the ruins of an old farm, on the old Continental Road, on the west side of Torne Pond. This is an escape from cultivation, rather rare and local, which I have seen in only one other place, on the bank above the greenhouse in Central Park, New York City, east of the Andrew H. Green memorial. Four to eight feet tall, with its stout, reddish stems, ("Bambooish" said one of the party, and it does suggest a bamboo) with its large, velvety leaves, and handsome sprays of white flowers, it is a striking plant and appeared quite the exotic that it is, in its surroundings of native plants, although there were a few other introduced species, characteristic of these old homesteads in the Highlands of the Hudson, such as lilac, syringa, crab-apple, and comfrey.

The False Fox-gloves, the Downy, *Dasystoma flava* and the Smooth, *D. virginica*, were seen along the old woodroads, and a somewhat rarer species was the Lousewort False Foxglove,

D. pedicularia, with its fine cut leaves and foliaceous calyx lobes.

Along the margin of Torne Pond, which had been raised two or three feet by a new beaver dam at the outlet and lowered in this summer's drought so that much muddy shore was exposed, interesting water plants were the Water Shield, *Brasenia Schreberi*, stranded in some places and floating in others; the Marsh Purslane, *Isnardia palustris*, stranded in the mud, and Linear-leaved Willow-herb, *Epilobium lineare*. *Clethra alnifolia* was in full bloom and pleasant with its strong, spicy odor.

Fungi were scarce, owing to the long drought, and likewise parasitic plants like Indian Pipe and Coral root, which were much harder to find than normally in these woods at this season.

Along the shore of the Hudson, the Purple Loosestrife *Lythrum salicaria* was in its usual striking display in mid-August. Upland occurences were found in the bottom of a dried up pond in the Bear Mountain nature trail area, and in a springy spot along the road leading up from Fort Montgomery. I have usually regarded the displays of this plant in the brackish marshes along the Hudson, between Stony Point and Poughkeepsie or higher, as the most resplendent, but in coming down from the Catskills, by automobile, via the Rondout and Wallkill valleys, on the morning of the 18th, I saw larger expanses along those streams and in meadows in Orange County, ten miles west of the Hudson, which were the most glorious in massed purple that I have ever seen. With Ironweed and Boneset, these meadows made gorgeous color combinations.

Raymond H. Torrey

NEWS NOTES

The Mediterranean fruit fly has been much in the newspapers since it was discovered in Florida in April of this year. With an appropriation of $5,000,000 Dr. Marlatt, Chief of the United States Plant Quarentine and Control Administration, organized an army of five thousand to wage a war of extermination. Their reports are encouraging, the spread of the fly has apparently been checked and in the regions of greatest infestation it has become difficult to find a specimen of the fly

in any stage of development. It is hoped that in this case the pest may be exterminated, not merely controlled as has happened in the past with the battles against other imported insect pests.

Tricholaena rosea, Nees, in the Bahamas. Mr. L. J. K. Brace has recently sent a specimen of Natal Grass to the New York Botanical Garden, collected by him as an escape from cultivation on a roadside in New Providence. This is an addition to the Bahama Flora. It may become as common there in time as it has in Cuba and Florida.

In the Proceedings of the Club, the meeting of March 20, a proposed amendment to the laws of New York State was referred to. The amendment, introduced by Senator Fearon and Assemblyman Sargent, both of Onondaga County, is as follows:

Subdivision 2 of Section 1425 of the Penal Law of the State of New York shall be amended to read as follows:

Cuts down, girdles, or otherwise injures or destroys a fruit, shade, or ornamental tree standing on the lands of another, or takes, picks, plucks, severs, carries away, removes or injures, in a manner to kill or cause to die, or destroys any plant, shrub, tree or vine of any wild or cultivated trailing arbutus (Epigaea repens), flowering dogwood (Cornus florida), mountain laurel (Kalmia latifolia), any of the moccasin flowers including Cypripedium acaule, Cypripedium pubescens, Cypripedium parviflorum, Cypripedium regina or either Gentiana crinita or Gentiana andrewsii or ferns of any kind growing on the lands of the people of the state or in any street, highway, public place or park belonging to or under the control of any county, city town or village; or Who wilfully digs up, takes or carries away the hart's tongue fern (Scolopendrium vulgare) from any location in Onondaga or Madison Counties, shall be guilty of a misdemeanor.

The Conservation Commission and the State Council of Parks, within their respective jurisdiction, their several employees, the State Police and all peace officers, are charged with the duty of enforcing this section.

Possession by any person of the whole or part of a plant which this section is intended to protect shall be presumptive evidence that the same was unlawfully taken by the possessor.

Work is under way for an addition to the Boyce-Thompson Institute for Plant Research in Yonkers. The present laboratory building is L-shaped, to this will be added on the north a 25

foot section to contain the main entrance and beyond that another L-building similar to, and equal in size to, the present building. The new building will house the library, offices, staff lunch room, photographic department and give room for some new laboratories. Rooms freed in the present building will also become laboratories. This will increase the laboratory space at least 50% and make room for an increase in the number of investigators in the same proportion. Work on the arboretum has progressed in the building of roads and paths, in the removal of underbrush and in the development of the nursery. The first planting in place of the material now in the nursery has been begun this fall.

In the last issue of Torreya there was a note from Mr. Torrey on *Vagnera stellata* in the sand dunes of Long Island. Dr. Edgar T. Wherry, of the Bureau of Chemistry and Soils, Washington, writes that this plant is one of the commonest herbs of its size in the sand dunes of Indiana. There the plant acts as a sand-binder, the rootstocks holding the sand on steeper slopes than would occur in the absence of vegetation. The only restriction to its growth in these sand dunes is its demand for a sterile but calcareous soil. It does not grow where the soil has been rendered fertile by an accumulation of humus, nor where they have become acid. Dr. Wherry suggests that in the colony on Long Island soil tests would show some source of lime sufficient to neutralize any acidity. The plant is a good example of the principle of the dominance of chemical over physical factors in controlling plant distribution. The plant seems to be indifferent, within reason, to wetness or dryness, but limited by the chemical charater of the soil.

The Brooklyn Botanic Garden are offering this fall thirty-eight courses in botany and gardening. Of these fifteen are for children, eleven especially for teachers, eleven for the general public and one for student nurses. For teachers, credit is granted towards advanced standing in colleges and universities and the courses satisfy the New York City requirements as to "professional alertness." Among the courses are ones in greenhouse work, field work in botany and nature study and advanced work in mycology, plant pathology, genetics and systematic botany.

A recent publication of The Indiana Department of Conservation, "Pollination and the Honey Bee," describes a new strain of shortheaded red clover developing in sections of the country where extensive agricultural development has resulted in a great reduction in the number of bumble bees. The new strain has flowers short enough to be pollinated by honey bees. It seems that a new species is being developed adapted to the honey bee according to the rules of natural selection.

Huron H. Smith, botanist at the Milwaukee Museum, will spend three months on the Oneida Indian reservation near Green Bay, Wisconsin, studying the aboriginal uses of plants. This is the sixth and last study to be made of the six Wisconsin Indian tribes, Menominee, Chippewa, Fox, Pottawatomi, Winnebago and Oneida. (Science.)

THE TORREY BOTANICAL CLUB

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796–1873

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THE TORREY BOTANICAL CLUB

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New York City

TORREYA

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Colloquial Names of Maine Plants

Anne E. Perkins

As all my early life was spent in Maine, I grew up to hear constantly certain folk-lore names of plants, and while Britton and Brown mention many in foot-notes, some I have never seen nor heard elsewhere. From early childhood I was always asking the names of plants.

The curious Equisetum arvense might not attract every child's attention, but it did mine, and its universal name was "*Gunbright*"* because it was used to brighten the metal parts of guns, as well as pewter. Not until many years later did I know it as "*Scouring Rush.*"

All the Lycopodia were "*Evergreen,*" clavatum, complanatum, obscurum, being the most common. Abies balsamea was never Balsam Fir, but always "*Fir Balsam.*"

Picea canadensis was called "*Skunk Spruce,*" and many a Christmas celebration in a hot school-house was marred by its odor. The Sagittaria in the brook (variabilis in those days), was never called anything but "*Waxflower.*"* Andropogon scoparius, a grass growing in thin, sterile soil was thought to "run out" and impoverish the soil, hence the name "*Wolf grass,*"* "*Poverty Grass.*"* Agropyron repens was "*Witch Grass,*" (*Wire Grass* less commonly); Lemna minor, *Frog-spit*; Veratrum viride, "*Poke root*"; Lilium Philadelphicum, "*Freckled Lily,*"* and children were warned not to look into them lest they also freckle. Clintonia borealis was "*Wild Lily of the Valley,*"* as were Pyrola elliptica and rotundifolia, and Dwarf Solomon's Seal and Spiranthes cernua. Smilacina herbacea, always "*Jacob's Ladder*"; Sisyrinchium, "*Blue Grass,*" (not Blue-eyed"). Cypripedium acaule, "*Valerian*"* and "*Nerve-root,*" and much esteemed as a

* The names so indicated, are those which I never heard elsewhere, nor do I find the name occurring elsewhere except as noted.

nerve-sedative, collected and used by the nervous. (In Western New York, all the Indians call the *yellow* Lady's Slipper, *Whip-poor-Will's Shoes.*") The Poplar was "*Popple,*" the American White Birch, the "*Gray Birch.*" Rumex crispus was "*Yaller dock,*" and the root one of the constituents of a spring tonic. Polygonum Convolvulus we knew as "*Wild Bean.*"* Amaranthus retroflexus was always "*Borax,*"* why I do not know; but "Red-root" was never heard. Phytolacca was always "*Garget*" given in B. & B., and used for cows which had garget. Portulaca oleracea was "*Pusley,*" as it is everywhere. Caltha palustris, always "*Cowslip,*" and valuable for "greens" in the spring. Coptis trifolia, "*Canker-root*" was used for children and adults with canker-sores or facial eruptions. Raphanus Raphanistrum was invariably "*Charlic*"; Sarracenia purpurea was often "*Fox-glove,*" as well as "Pitcher Plant." Sempervivum tectorum, "*Live Forever,*" "*Bag-plant** (because the children blew up the leaves), and "*Aaron's Rod.*"* Saxifraga pennsylvanica was used as greens, and never called anything but "*Wild Beet.*"* Spiraea tomentosa, used as a country remedy for dysentery, had no name but "*Wire-bush.*"* Potentilla canadensis was "*Little Buttercups*"; Pyrus arbutifolia, "*Choke-pear*";* Amelanchier canadensis, "*Sugar-pear.*"* Prunus serotina, "*Rum Cherry,*"—rum was added and the cherries left in the bottle, the liquid used in dysentery. Trifolium arvense, "*Pussy-foot Clover,*"* and T. hybridum, "*Pink Clover.*"* Apios tuberosa, "*Chocolate*"* (name from the color of the flowers); Impatiens fulva, "*Snap-weed.*"* Euphorbia Cyparissias, "*Cypress*"; Rhus Toxicodendron, "*Markry,*" ("*Mercury*" less often). Ilex verticillata, "*Holly*"; Nemopanthus mucronata, "*Dogberry*";* Malva rotundifolia, "Cheeses" universal name; Aralia nudicaulis, "*Sassafrilla.*" Cornus canadensis "*Bunch-plum*"; Chimaphila umbellata was "*Noble Pine*" (Britton & Brown give this) and "*Pyroly.*" Kalmia augustifolia, "*Lambkill.*" Gaultheria procumbens always was "*Ivory Plum.*" The late black Gaylussacia baccata is always "*Stony Huckleberry.*"* (a good name). Lysimachia quadrifolia, "*Liberty-tea,*" (we were always told it was so-named because this plant was used to avoid tea-taxes). Nepeta glechoma, "*Robin-run-away,*" "*Gill-go-over-the-ground*"; Hedeoma pulegioides, "*Pennyr'yal.*" Mentha canadensis, "*Brook-mint*"*; Physalis (probably heterophylla), "*Husk tomato.*" Plantago major was

"*White man's Foot,*" (said to have been so called by the Indians) because it was found everywhere man went, even around the old logging camps. Galium asprellum, "*Clivers*" (*Cleavers*), "*Kidney-vine,*"* used in kidney troubles by the country people. Viburnum dentatum, "*Withe wood*" *Moose-wood.* Lobelia inflata, "*Indian Tobacco,*" "*Puke Weed.*"* used in asthma. Eupatorium perfoliatum, "*Boneset,*" a great remedy in the country. Lacinaria scariosa, "*Devil's Bit.*" Asters were "*Frost flowers,*"* and A. cordifolia was known as "*Tongue*"* and used as greens. Erigeron annuus was called "*Little Daisies.*"* Antennaria was "*Indian Tobacco*" or "*Pussy Toes.*" Bidens frondosa was "*Beggers' Lice*"; Achillea millefolium was "*Nosebleed Plant*"; Anthemis Cotula was "*Stink weed,*"* "*Pig-sty Daisy.*"* Chrysanthemum Leucanthemum was "*White-weed*"; Rudbeckia hirta was "*Ox-eye Daisy*" and "*Yellow Daisy;*" and Chrysanthemum Balsamita was "*Rosemary.*"* Artemisia Abrotanum, *Southern-wood*, "Old Man," "Old Woman," a sprig of which was carried to church and to funerals. Artemisia vulgaris, "*Motherwort.*" (Artemisia absinthum was used as an application in sprains.)

Many herbs were saved and used in the household which I learned later are valuable in medicine.

Gowanda State Hospital,
Helmuth, N.Y.

Aconitum noveboracense A. Gray

H. A. Gleason and Wm. J. Bonisteel

This rare species was originally discovered by A. Willard in Chenango county, New York, prior to 1857; it was again collected near Oxford, in the same county, by A. L. Coville and F. V. Coville in 1885 and 1887. It was later found by Mr. and Mrs. Van Brunt along the Beaverkill in Ulster County and again along the same river by Dr. H. H. Rusby in 1891. So far as we know, without making an exhaustive search of literature or herbaria, these are its only known stations.

Dr. Rusby remembered clearly the details of the location where he found the plant. With his directions in mind, we visited the banks of the Beaverkill river on August 12 and 13, 1929 and succeeded in locating possibly a hundred plants, ranging in height from a few inches to four feet, and in condition from young seedlings to blooming or fruiting adults. The season of bloom was in general past, and the few flowers remaining were mostly on lower lateral branches. Only a small fraction of the flowers were producing seed. It is quite possible that the season was a difficult one for the plants. Floods in 1928 had raised the river to unprecedented heights and probably washed out many of the rhizomes, while the exceptional drought of 1929 was certainly not favorable to them. They were also extraordinarily difficult to find, chiefly because of the lack of flowers. We know that we passed slowly through the best colony of them three times before we saw any of them, and then located at least fifty within a few feet of each other. It is gratifying to know that they are producing viable seeds and reproducing; certainly more than half of the plants were healthy juveniles which had not yet bloomed.

The Beaverkill river, a clear rushing stream, flows here through a narrow valley with a small strip of alluvial deposits on one or both sides. This flood-plain is by no means flat, but is frequently diversified by narrow ridges of almost pure sand, merely stained black by humus, rising one to three feet above the general level and quite variable in length. These ridges usually lie nearer the river than the bluffs, and are separated from the bluffs by a depression which sometimes approaches a swamp in character and almost always shows an approach to

hydrophytic conditions in the abundance of *Chelone glabra* and *Eupatorium perfoliatum*. The ridges lack these species and are distinctly mesophytic in character. All parts of the valley are well shaded by *Acer saccharum*, *Acer spicatum*, and other trees and shrubs. *Aconitum noveboracense* lives, so far as we observed, only on the ridges, which it shares with a dense growth of *Rubus odoratus*, *Monarda didyma*, *Arisaema triphyllum*, *Onoclea sensibilis*, *Osmorhiza longistylis*, *Solidago flexicaulis*, and unidentified species of *Hydrophyllum* and *Thalictrum*. Blooming plants of the aconite rise approximately to the general level of these herbs. Beneath them, and consequently in still denser shade and subject to still greater competition for space, the seedling aconites are mingled with *Mitella diphylla*, *Viola scabriuscula*, and *Fragaria virginiana*.

It is probable that search over other parts of the valley, especially in the blooming season will reveal numerous other plants of this rare species, which, however, shows no indication of being in danger of extinction.

New York Botonical Garden

Notes on the Flora of Louisiana

CLAIR A. BROWN

Louisiana is one of the states in which relatively little systematic botanical work has been done. Some of the more noteworthy articles on the flora of the state have been obscurely published. The citations of some of these publications have often been incorrect.

R. S. Cocks (6) presented a paper before the Louisiana Society of Naturalists on "A Historical sketch of the Louisiana Botanists," and gave a bibliography of fourteen references. In a later publication Cocks (8) stated that Featherman had prepared a manuscript on the "Flora of Louisiana" which was sent to the Smithsonian Institution but was never published, and that Featherman's collections were totally destroyed. Between one and two thousand specimens of Featherman's collection form the nucleus of the present herbarium of the Louisiana State University.

E. A. Featherman (2, 3, 4) published a series of three articles which are often cited as in the "Geological Survey of Louisiana." They appeared as a part of the "Report of the Board of Supervisors of the Louisiana State Seminary of Learning" 1870, and of the Louisiana State University for the years 1871 and 1872, which are contained in the "Legislative Documents of Louisiana," along with the reports of the geological survey. A more detailed account of these articles will appear at a later date.

6. Cocks, C. S. "Proceedings of the Louisiana Society of Naturalists." 1900.

8. Cocks, C. S. "Flora of the Gulf Biological Station." Bull. 7 of the Gulf Biological Station.

2. Featherman, E. A. "Report on the Botany of Louisiana" Legislative Documents of Louisiana pp. 11–122, 1870.

3. Featherman, E. A. "Report of the Botanical Survey of South and Central Louisiana." Legislative Documents of Louisiana pp. 1–132, 1871.

4. Featherman, E. A. "Third Annual report of the Botanical Survey of Southwest and Northwest Louisiana." Legislative Documents of Louisiana pp. 101–161, 1872.

The following list of plants can be considered as extending the published distribution of the species. They are recorded from Louisiana for the first time unless otherwise noted, or they have been included because of some feature that makes their occurrence noteworthy. All specimens mentioned are in the Louisiana State University Herbarium.

Soliva sessilis R. & P.

This species is reported in the North American Flora for Mississippi and California (?) as an adventive from South America. Its abundance is such that it can be classed as a plant that is thoroughly naturalized. In many places it forms a mat of such an extent that it gives the impression of a closely clipped lawn. Represented by the following collections: Baton Rouge, *Brown 932;* East Baton Rouge Parish, Stewart's Swamp, *Brown 1872.*

In Small's flora (9) the genus *Soliva* is represented by only one species, *S. nasturtiifolia* (Juss.) DC. which has been transferred to the genus *Gymnostyles* (12). The genus Gymnostyles is represented in Louisiana by *G. anthemifolia* A. Juss. and *G. nasturtiifolia* A. Juss., both of which have been reported from Louisiana and which I find very abundant as weeds particularly in the streets of New Orleans and Baton Rouge as well as other parts of the state.

Verbena rigida Spreng. Syst. Veg. 4, pt. 2, 230, 1827.
V. venosa Gills & Hook. Bot. Misc. 1, 167, 1830.

Small (9) reports this species as *V. venosa* from around Houston, Texas, as naturalized from South America, and describes the plant as an annual. Our plant fits the description in Small's flora very well with the exception that the plant is perennial, and has a long branching rhizome from which many plants arise.

9. Small, J. K. "Flora of Southeastern United States." 1913.
12. "North American Flora."

Mohr (7) whose synonomy I have followed states that the plant is an escape from cultivation and is naturalized in the Gulf coast states and south Texas. Mohr also states the plant is a perennial. This plant is common in many places and forms dense patches which are conspicuous along roadsides due to the brilliant color of the blossoms. It is represented by the following collections: Baton Rouge, *Peterson* , 1909; Covington, *Peterson,* 1909; Baton Rouge, *E. A. Bessey,* 1909; Kleinpeter, *Brown 1054.*

Bowlesia septentrionalis C. & R.

Coulter and Rose (5) give the range of this species from Texas to Southern California and north to the Sacramento Valley. Their description calls for white petals. Our plant has purple petals in the fresh state. De Candolle (1) lists seven species but makes no mention of the color of the petals. In view of the fact that purple and blue often fade in herbarium specimens, and that the description was based upon herbarium specimens, I venture to amend the description as to the color of the flowers. The petals are purplish, less than one millimeter in length, ovate-oval in shape and usually dry whitish.

One of the collections which Coulter and Rose cite as being typical of this species was collected by J. F. Joor near Galveston, Texas, April 21, 1877. There are two sheets of this collection in the Louisiana State University Herbarium, also one from the Banks of the Brazos near Calvert, Texas, April 22, 1880, by Joor, which are identical with our plants with the exception that the petals show no color. The collection on which the purple petals were noticed was from lawns and waste places in New Orleans, *Penfound* and *Brown 2063*.

Calyptrocarpus Tampicana (DC.) Small

Small records this species from Southern Texas and also tropical America. This species is a common weed in waste places in New Orleans. It blooms nearly the year round.
New Orleans, *Penfound & Brown 2065.*

Stachys agraria Cham. & Schl.

The range as given by Small is Texas and Mexico. Mohr reports this species from Mobile Co., Alabama, as "a fugitive on ballast but observed subsequently." It is abundant in several places in Louisiana but it is more abundant in the open fallow fields than in the shady woods, although it has been found in both habitats. West Baton Rouge Parish, *Brown 1756;* Baton Rouge, *Peterson* 1909: *Brown 1911.*

7. Mohr, C. "Plant Life of Alabama." 1901.
5. Coulter and Rose. "North American Umbelliferae." 1900.
1. De Candolle. "Prodromus." pt. 4, 75.

Triadenum longifolium Small

This species is recorded from Alabama and Florida. East Baton Rouge Parish, *Brown 1512.*

Chamaesyce humistrata (Engelm.) Small

Small gives the range of this species as from Quebec to New York, Kansas and Mississippi. This plant was found in sandy soil that had been flooded by the Mississippi River. Baton Rouge, *Brown 1229;* near Port Allen, *Brown 1524.*

Osmunda regalis L.

This species is recorded from New Brunswick to Nebraska, Florida and Mississippi. It is not rare in Louisiana as can be seen by the following records: Old Seminary, (Alexandria La. *Featherman*, 1869?; Covington, *Peterson*, 1910; Baton Rouge, *Peterson*, 1910; De Quincey, *Peterson*, 1912; near Baton Rouge. *Brown 1865, 1897.*

Botrychium obliquum Muhl.

Small quotes the range of this species from New Brunswick to Minnesota and south to Florida. The North American Flora limits its southern range to Georgia and Arkansas. It has been found several times in Louisiana as the following records show: Baton Rouge Comite swamp, *Joor*, 1885; East Baton Rouge Parish, *Joor*, no date (apparently var. dissectum (Spreng.) Clute); near Harelson, *Brown 1181.* W. R. Maxon, to whom this specimen was sent for identification, writes that it is apparently a depauperate form of var. tenuifolium (Underw.) Gilbert.

Duchesnea indica (Andr.) Focke.

In waste places New York to Florida and Alabama. This plant is very common around Baton Rouge, not only on the edges of cultivated fields and waste places but in rather dense wood lots that have not been cut or pastured recently. Baton Rouge, *Peterson*, 1909; Harrisonburg, *G. Meeker*, 1913; Baton Rouge, *Brown 879.*

Myosurus minimus L.

This species is recorded from southern Ontario to Illinois, Kentucky, and Florida. It is not very abundant in Louisiana, where it occurs in cultivated fields: New Roads, *Peterson*, 1909; Baton Rouge, *Joor*, 1874: *Peterson*, 1910,: *Brown 1906.*

Andropogon Tracyi Nash

Reported from Alabama and Mississippi. This species was collected in pine woods near Kleinpeter, *Brown 1499*, Det. A. S. Hitchcock.

Conobea multifida (Michx.) Benth.

Small quotes the range of this species from Pennsylvania to Iowa, Tennessee, and Texas. Pennell (11) does not include it for Louisiana. New Orleans, *Featherman* at "Stock landing Ferry," 1870; Baton Rouge, *Joor* (?) 1885: *Brown 1159.*

Viorna viorna (L.) Small

The range as given by Small is from southern Pennsylvania to Ohio, West Virginia to Georgia and Alabama. This species was reported by Featherman (3) in 1871, and is represented in the herbarium by the following collections: Baton Rouge, *Brown 1001;* Franklin, *Brown 1845.*

Clematis virginiana L.

Reported by Small from Nova Scotia to Manitoba, Georgia and Kansas. This species was reported by Featherman in 1871. Baton Rouge, *Brown 1133.*

Trillium sessile L.

Small gives the range as Pennsylvania to Minnesota, Florida and Mississippi. Featherman reported it from Louisiana in 1871. The following specimens are in the herbarium: East Baton Rouge Parish, near Amite River, *Featherman*, no date; Baton Rouge, Joor, 1868: *Peterson.* 1909: Stevensdale, *Bell*, 1913; *Brown 880*; Catahoula Parish, Harrisonburg, *G. Meeker*, 1913; West Feliciana Parish, St. Francisville, *Brown 1891;* Livingston Parish, *Brown 1660.*

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Baton Rouge, La.

11. Pennell, F. W. "Scrophulariaceae of the West Gulf States." Proc. Acad. Nat. Sci. Phila. pt. 3, 1921.

The Flora of Doi Sutep, Siam

T. D. A. Cockerell

In northern Siam at the end of the railway, is the town of Chiengmai. Until recently, this region could only be reached after a journey of many weeks, but now the visitor travels comfortably and quickly in the train from Bangkok. In Chiengmai, there is a group of American missionaries, who maintain an excellent hospital. We (Mrs. Cockerell, Miss Alice Mackie and I) were kindly invited to stay with Dr. and Mrs. James W. McKean, with the promise of a trip up the great mountain, Doi Sutep. Dr. McKean is in charge of the leper hospital, a model institution which owes its existence and its many admirable features to his skill and industry. Here and elsewhere the work of the medical missionaries in Siam is of great value and deserves hearty support. It is now supplemented by the various activities of the Rockefeller commission, which during the year before our visit gave no less than 186,000 treatments for hookworm, to nearly as many different people. American activities abroad are sometimes criticisable, but in Siam they appear to be and to have been in the past, entirely praiseworthy. One consequence of this is that the botanist or zoologist travels where he will, in peace and security, with the good will of the people. Even the Buddhist priests are friendly, and on one occasion we were permitted to camp in a Buddhist temple, sleeping none the worse for the placid figure of Buddha looking down on us during the night.

When the day came, early in February, to ascend Doi Sutep, we were taken in an automobile to the foot of the mountain, where we found awaiting us a group of men with chairs on poles, to convey us up the steep slopes. We were a little inclined to feel superior to this luxurious mode of transit and did in fact do a good deal of walking, but I for one was often glad of the assistance, and found it necessary. Doi Sutep rises to an altitude of about 5,500 feet above sea level, high enough to have elements of the temperate flora on the top. I was mainly concerned with insects, and had not intended to collect the plants, which have been quite fully investigated by others. Yet there were so many interesting species of plants that I took some papers and gathered more or less fragmentary specimens of many, which were

nearly all named for me later by Dr. A. Kerr, the government botanist in Bangkok. Near the foot of the mountains we met with the beautiful *Mussaenda hossei* Craib, with large white calyx lobes. This shrub was described from Doi Sutep: the genus extends to tropical Africa in one direction, and Polynesia in the other. On the trail we picked up the very large flowers of the Bignoniaceous *Markhamia stipulata* Seem. Elaeocarpaciae were represented by *Elaeocarpus robertsonii* Gamble, a very fine thing. The Convolvulaceous *Porana racemose* Roxb., a smallish delicate form, with flowers in clusters was especially interesting to me because I had collected fossil *Porana* at Florissant, but had never seen a living specimen before. The Acanthaceae were rather conspicuous, including the large flowered *Thunbergia laurifolia* Lindl. and *Strobilanthes pentstemonoides* T. Andr., and *Daedalacanthus tetragonus* T. Andr. (*Eranthemum tetragonum*), a rather phlox-like plant with pink flowers and long slender opposite leaves.

In a wet place near the Queen's Garden, about half way up, the small pink flowered spikes of the Lythraceous *Rotala rotundifolia* Koehne were conspicuous. I did not see it anywhere else. Large oaks in the gulches on the slopes proved to be *Quercus semiserrata* Roxb. I picked up an oak-coccid of the genus *Kermes*, the genus new to Siam, and the species probably undescribed. The mountain is famous for its oaks; I found ten listed in the literature, and Dr. Kerr tells me there are still others. Four species (*Q. garrettiana* Craib, *Q. kerrii* Craib, *Q. kingiana* Craib and *Q. sootepensis* Craib) were based on Doi Sutep specimens. Of the others, one ranges to Java and Formosa (the nut is edible and it may have been carried about), but most extend into Burma or Assam. There are also three species of *Castanopsis* on the mountain. Malvaceae were represented by *Thespesia lampas* Dalz. & Gibs., the name apparently referring to the rather lantern-like five parted fruit. Another five parted fruit belonged to the genus *Schima* (*S. wallichii* Choisy or *S. brevipes* Craib), one of the Ternstraemiaceae,—also belonging to the latter family is *Anneslea fragrans* Wall, with fine dark red flowers. As might be expected, Leguminosae were common; those collected included *Crotalaria ferruginea* Grah., with yellow flowers; the large flowered *Bauhinia variegata* L.; the creeping *Dolichos subcarnosus* Prain; *Lespedeza pinetorum* Kurz, with long three-part-

ed leaves, pale beneath; and *Desmodium floribundum* Sweet (*Meibomia floribunda*). The genera are very familiar to American botanists. *Bauhinia* is everywhere conspicuous in the Siamese jungles, with several species. Similarly, the Compositae have for the most part a familiar aspect. I obtained *Vernonia volkamerifolia* D. C., with large heads or clusters of heads; *Ageratum conyzoides* L., a well-known tropical weed also found in Panama; *Anaphalis margaritacea* B&H, (I suppose it was the variety *cinnamomea* Clarke); *Senecio nagensium* C. B. Cl. var. *lobbii* Hook. fi., a robust species with large leaves, pale below; *Laggera flava* Benth., with yellow flowers; *Bidens pilosa* L., a cosmotropical weed with white rays, a *Gynura* with white pappus, and some others. There was a *Vernonia* with dark-tipped involucral bracts, new to Dr. Kerr, and possibly undescribed. On and about the summit were many ferns, *Pteridium aquilinum* and species of *Pteris*, *Cheilanthes* and *Drynaria*. Two grasses, *Imperata arundinacea* Cyr., with a long spike,and the tall *Pollinia grata* Hack., were especially conspicuous. The flora on the summit included a number of species characteristic of temperate regions. *Rubus kerrii* Rolfe, with leaves pale below, was originally described from this locality. Two species of *Polygonum*, one a Persicaria-like species referred to *P. chinensis* L. var. and the other a large robust plant doubtfully determined as *P. damrongianum* Hosseus. Some of the Polygonum was heavily infested with the fungus *Ustilago utriculosa*, for the name of which I am indebted to Dr. Seaver. I was very much pleased to find *Viola serpens* Wall., with pale flowers. It was originally described from Nepaul. There are three other species of *Viola* in the Siamese flora. My wife collected the orchid *Eulophia nuda* Lindl. on the summit. The large *Lilium nepalense* D. Don, common on the summit, had gone to seed, but we collected seeds and dug up a bulb which was sent to Kew. This species flowered in the garden of Trinity College, Dublin in 1923. A quite different liliaceous plant was *Dianella ensifolia* Red.; I later (April 15) saw the genus again in Australia, finding *D. tasmanica* in Upper Fern Tree Gully, Victoria. The slender *Impatiens violiflora* Hook. fi., with knobbed glands, served to remind us of the famous botanist who specialized on *Impatiens* when over 90 years old. A very interesting and curious plant of the summit, very small, with a long red corolla, proved to be the Gesneriaceous

Aeschynanthus persimilis Craib (*Trichosporum persimile*). There were two Labiatae of the genus *Pogostemon*, with long spikes. One is *P. glaber* Benth., and the other *P. fraternus* Miq. A species of this genus is an important perfume plant in India, and I noticed that *P. glaber* was strongly scented. A parasitic plant without chlorophyll was referred doubtfully to *Chierostylis macrantha* Schl. The pines growing on the summit, with long leaves in threes, belong to *Pinus khasya* Royle. I am not quite sure that they had not been planted, as they were in the immediate vicinity of the buildings used by the missionaries as a summer resort. A large species of *Commelina* grows on the summit. The flora certainly has rather strong Himalayan affinities, but Craib remarks on the resemblances to the flora of Yunnan. There are species in common with Mengtze, where Henry collected. The Doi Sutep flora has been investigated by a number of botanists and lists of the species are given by Professor W. G. Craib, of the University of Aberdeen. The number of new species described from the mountain is amazing. I have noted over 70, and my list is not nearly complete. This include members of such genera as *Mussaenda* (three) *Passiflora*, *Gardenia*, *Cephaëlis*, *Ipomoea*, *Loranthus*, (two), *Antidesma* (two), *Olea* (two), *Jasninum*, *Rubia*, *Styrax*, *Ardisia*, *Thunbergia*, *Utricularia* (two), *Clerodendron*, *Elaeocarpus*, *Arisaema* (three), *Smilax*, *Zingiber* (three), *Globba* (five), *Ophiopogon* (two) etc, etc. There are three species of palms on the mountain, belonging to *Wallichia*, *Calamus* and *Plectocomia*. There is also a Pandanus. Richly represented families are Scitaminaceae, with 29 species; Liliaceae, with 16 species; Commelinaceae, with 18 species, and Araceae, also with 18.

Thus Doi Sutep is a veritable paradise for botanists, and is, I suppose the best locality in Siam which can be visited without much trouble. With such a flora naturally goes a similarly varied fauna, which, at least among the insects, will furnish innumerable novelties. The cryptogamic flora must also be very interesting, and except for the vascular species, is hardly known.

There is some variation in the spelling of Doi Sutep. Craib formerly wrote Doi Sootep. Hosseus (Bot. Jahrb. 1908) has Doi Sutap. R. le May in his excellent book on Siam, has Doi Sŭthép. Doi means mountain.

University of Colorado,
Boulder, Col.

Who's Who Among the Microbes?[1]

This new book, "Who's Who Among the Microbes," by Drs. Park and Williams is strongly recommended to the attention of Biology and Hygiene teachers and to anyone who is interested in learning definitely the most up-to-date facts about bacteria. It is really a "biology" of bacteria and includes also, a consideration of the economically important pathogenic protozoa.

Some of the chapter headings will give a good idea of the organization of the text; e.g., "Early discoveries"; "How microbes can be better known";"The Coccus family";"The bloodthirsty tribe"; "Bacteriophages;" to list only five of the twenty chapter topics.

The authors' position in the field of bacteriology guarantees the authority of the contents. Those who have had an opportunity to hear Dr. Park in his occasional addresses to the Biology Teachers' Association do not need to be told that the book is clearly written, simple and lucid.

The book will be useful as a re-survey of the field for teachers who have had courses in bacteriology and extremely valuable as introductory reading for others who have not had such work. It can be recommended for library purchase in some quantity for reference reading by pupils in hygiene and biology classes.

Its recency of publication makes it a source of information in a field in which no old book is safe authority. It has a good account of the rather new disease, tularemia. It may be a surprise to many, as it was to the reviewer, to learn that the Noguchi spirocheate, Leptospira icteroides, is no longer accepted as even the probable cause of yellow fever. "And the results from the recent investigation of African yellow fever, including the tragic death of Noguchi there from the disease while studying it, have all given evidence that yellow fever, at least in some parts of the world, must still be listed with the filterable viruses."

RALPH C. BENEDICT

[1] By William H. Park and Anne W. Williams, Century Co., 1929.

Deam's Grasses of Indiana[2]

The people of the State of Indiana are to be congratulated on having a citizen competent to write a book of this nature and a Department of Conservation to provide means for its publication and distribution. Convincing in its scientific treatment, lucid in its presentation, and complete in its information, the "Grasses of Indiana" certainly approaches the ideal.

The plan of the book is comprehensive. Besides a careful and extended description of the grass family in general, it provides keys to the tribes, genera, and species, a full bibliography, a glossary, a list of reported but excluded species with the reasons therefor, a list of new state and country records, and a list of new species and names. The single new species in *Panicum Deamii*, described by Hitchcock and Chase. Under each genus a technical description appears with other general information about its range and number of species included. For each species the usual description is supplemented by full notes on its habitat, its importance in agriculture, if any, and its general geographic description, by a map showing its known range through the state, and by a carefully drawn figure showing the details of its structure. The figures are with one exception by Professor Paul Weatherwax of Indiana University. A general map shows the floristic regions of the state.

The grasses of Indiana comprise 201 species, 19 varieties, and 7 minor forms, and constitute about a tenth of the total flora of the state. In his preparation of the book the author examined over seven thousand specimens and it is noteworthy that just half of them were in his personal herbarium. The maps show the herbaria in which specimens from each county may be found.

H. A. Gleason

[2] Deam, Charles C. Grasses of Indiana. pp. 356, with 23 figures, 87 plates, 218 maps. Published by the Department of Conservation, State of Indiana, 1929. Price not stated.

FIELD TRIPS OF THE CLUB

Field Trip of September 8, 1929

Muggy, hot weather, threatening rain, did not prevent ten enthusiastic botanists from participating in the trip to Fresh Kills and vicinity, Staten Island. Most of those present promis-

ed to send some of the specimens collected on this trip to Mrs. Mitchell for the Torrey Club Herbarium.

At the start of the trip, near the bus terminal at Richmond, several Polygonums were found in the stream where it passes through the culvert under the road—viz. the tearthumbs, *Polygonum arifolium* and *P. sagittatum*, also *P. Hydropiper* and the common Lady's Thumb nearby, *P. Persicaria*. *Impatiens biflora*, conspicuous at this time of the year, grew rankly along the banks of the stream. In the meadow nearby we found that *Amorpha fruticosa* was established, and also *Solidago rugosa* and *canadensis* as well as the Iron Weed—*Veronica*. Where the road turns by the fine old church of St. Andrew, parts of which date back to 1709, *Broussonetia papyrifera* and *Maclura pomifera* appeared to have established themselves.

As we walked further along the road bordering the marsh land around the "Fresh Kills" colonies of tall yellow wild sunflowers could be seen at a little distance below us on the left which appeared on examination to be *Helianthus giganteus*. A specimen of Helianthus was discovered later which possessed a glabrous stem and corresponded more nearly to *H. grosseserratus*, but these two species, according to the manual, are very near to each other. Luxurious *Amaranthus ambrosioides* was found near the roadside. Near some old houses we found an excellent deep spring on the left, near the road, with sides stoned and delicious cool water which must have been innocuous if we are to judge by results, for we all drank deeply of it.

Everything about us was so moist that it was difficult to find a dry place whereon to sit while eating our lunch. We finally spied a steep little hill on the right, not far from the road, and after much scrambling through the brush and (some of us) getting "runs" in stockings, we arrived at the top and found to our surprise an old abandoned cemetery. About a half-dozen gravestones were in evidence—most of them prone on the ground and one even had been used as a prop for a camp fire.

This hill, according to Wm.T.Davis,[1] is Ketcham's or Cemetery Hill, the last hill in the range that commences at Brighton Point and terminates suddenly at Richmond Creek. "A better view may be had of the meadows from the top of this hill than from Look-Out-Place (the next elevation to the northeast.) For

[1] Proc. of Nat. Sci. Assn. of Staten Island. **5**: 42. 1896.

over a hundred years the crown of the hills has been used as a family burying ground."

After lunch we proceeded to explore the salt marshes near the kill. On the border of the marshes we were pleased to run across *Bidens comosa*, so different with its simple leaves from the common *B. frondosa* which we had already seen. The green bracts surrounding the flower heads are also conspicuous. In the marsh, *Iva oraria*, the Marsh Elder, was abundant and in flower, while *Baccharis halimifolia*, the Groundsel Tree, could be seen from a distance with its masses of small white flower heads—both pistillate and staminate flowers being plentiful. *Atriplex patula* var. *hastata* was everywhere underfoot and climbing over other plants. The pretty little *Gerardia maritima* was also found in the new short salt grass, recently cut for hay, and later we found the *Gerardia purpurea*. *Pluchia camphorata*, one of the objects of the trip, was collected here but was not plentiful. Perhaps the greatest thrill of the day was the finding of the beautiful, rose-colored *Sabatia stellaris*, at first in such small numbers that we let it stay, but coming upon a larger colony afterwards, we took a few specimens. An umbelliferous plant with filiform leaves was found which proved to be *Ptilimnium capillaceum*, mock bishop's weed. Most of the party returned via S. I. R. R. from Eltingville, walking to the station, but some took the bus back from Richmond.

A. H. Graves

Field Trip of October 19

Twenty six members and friends of the Torrey Club met at Hillside, Queens Borough, for an afternoon trip to study goldenrods. The leader of the trip, Dr. Alfred Gunderson had gone over the ground carefully and listed ten species of goldenrod to be found. He had also prepared a simple key to these species, based primarily on shape of the flower cluster,—mimeographed copies of this key were given the members. In a field not far from the station the rapid-growing kudsu vine was noticed. The goldenrods found were collected, to be compared and worked out with the key later. While it was late for any flowers, some of the goldenrods were in good condition, and all of those looked for could be determined. Dr. Gunderson's key is included as it may be of interest to others.

SOLIDAGO (About 50 species, about 25 around New York)

INFLORESCENCE FLAT TOPPED, HEADS SESSILE

2–4 ft., lvs. 3–5 veined, fragrant—*graminifolia* (Flat top G.)

1–2 ft., lvs. 1 veined—*tenuifolia* (Narrowleaved G.)

INFLORESCENCE OF AXILLARY CLUSTERS

Leaves narrow—*caesia* (Wreath G.) Stem "zigzag," often purple

INFLORESCENCE AN EQUILATERAL PANICLE

Color whitish—*bicolor* (Silverrod) Stem pubescent

INFLORESCENCE A ONE SIDED PANICLE (secund)

Leaves nearly of one kind, narrow, three veined

2–6 ft., stem grayish, puberulent, leaves thick, heads large—*altissima* (Tall G.)

1–4 ft., stem glabrous below, lvs. thin, heads small—*canadensis* (From Nfd. south)

2–7 ft., stem and lvs. glabrous, leaves broader, sharply serrate, rays long—*serotina* (Late G.)

Lower leaves much larger, pinnately veined

Plants low, lvs. oblanceolate, grayish—*nemoralis* (Low G.)

Plants taller

Stem villous, leaves thick wrinkled, rays 6–9—*rugosa* (From Nfd.) (Rough-leaved G.)

Stem glabrous, lvs. thin tapering, racemes loosely recurved spreading, rays 4—*ulmifolia* (Elmleaf G.)

Stem & leaves glabrous, turning red—*juncea* (Early G. Upper lvs. entire smooth)

Field Trip of October 27

Twenty-five members and friends of the club were led by Mr. J. A. Allis on a very interesting and delightful trip from Sterling Forest to Cedar Pond. Of as much interest as the species of plants found,was the mass effect of the foliage. The oaks, red, black, scarlet, white and chestnut, still held most of their leaves and covered the hills with reds, browns and dull yellows. Sugar maples were yellow and red, beeches were mostly brown or nearly leafless, but in one of the stream valleys a group among the hemlocks were a golden yellow. From the fire lookout tower on Sterling Mountain the effect of the colors was especially fine. On the top of the mountain it was noted that the scrub oak, *Quercus ilicifolia*, had lost most of its leaves and all of its fruits. The approach to Cedar Pond is over an old corduroy road through a dense growth of white cedar, *Chamaecyparis thyoides*, and rhododendron with a few red spruce, *Picea rubra*, the ground covered with fern mosses and hypnums and frequent pat-

ches of the liverwort, *Bazzania*. Around the pond the shrubby growth whose roots seemed to be the support of the bog, was mostly leather leaf, *Chamaedaphne calyculata*, with a little pale laurel, *Kalmia polifolia*, and high-bush huckleberry. Growing in the sphagnum there was an abundance of pitcher plants, ranging from seedlings with leaves less than an inch long to mature plants, many of them a deep red in color. Near the edge of the bog were some large patches of the trailing club moss, *Lycopodium complanatum*, with it the more erect tree club moss, *L. obscurum dendroideum* on somewhat higher ground and the bog club moss, *L. inundatum*, on the lower, damper ground. Here and there were small patches of the shining club moss, *L. lucidulum*. Where there were rock outcrops the ledges were fringed with the polypod fern, throughout the woods were quantities of the marginal and intermediate fern, splendid plants of the Christmas fern bordered the paths, some, approaching the variety *Schweinitzii*, had fertile fronds that measured 36 inches, the sterile over 24 inches. Several plants of *Botrychium obliquum* and a few of the variety *dissectum* were found. The three Osmundas and the hay-scented fern were noted, but all brown and withered as was the common brake, the latter with stipes bent over and crushed.

For those who had been on the trip the week before it was interesting to observe nearly all the goldenrods observed that time, excepting *Solidago tenuifolia* and *ulmifolia* and to add the ragged goldenrod, *S. squarrosa*, the broad-leaved goldenrod, *S. latifolia*, and the large-leafed, *S. macrophylla*.

George T. Hastings

Hook Mountain Excursion, November 3

Four members of the club, undaunted by a day of frequent heavy gusts of rain, made the excursion from Congers to Nyack, along the short of the Hudson, on Sunday, November 3. The route between the lower landing of the Hook Mountain section of the Palisades Interstate Park, under the beetling Verdreitege Hook, to North Nyack, was over great masses of trap talus, some original and unaltered by man, some left when the quarries were abandoned ten years ago. Only a few plants remained in bloom, those noted including *Helianthus decapetalus*, *Aster*

ericoides, *Eupatorium ageratoides*, and *Geranium Robertianum* which has about the longest blooming season of any plant I know, almost from the latest spring frost to the killing frosts of autumn.

Interesting species new to some of the party were the Bladder Nut, Staphylea, in great banks with thousands of the conspicuous three lobed bladdery fruits: Triosteum, the Wild Coffee, or Tinker's Weed, with plentiful orange fruit which some of the party gathered to take home to try out as a beverage; and Paulownia, which has established itself at the foot of the cliffs, as it has along the Palisades. Signs were seen of the American Wood Rat, which still persists in holes in the talus, the only locality where it is still found within 30 miles of New York City, so far as I know. Striking exposures of the red sandstone underlying the trap cliffs were seen, including some partings of the strata with ripple marks and what appeared to be casts of marine worm burrows.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of October 16, 1929

The meeting was called to order by President Denslow.

Mr. S. S. Shouse, Long Island College Hospital, Brooklyn was unanimously elected to membership in the club.

Dr. Denslow presented an appeal from Dr. Clyde Fisher for the support of the Coordinating Council of Nature Activities by a financial contribution from the club. This was referred to a committee consisting of Dr. Britton, Dr. Barnhart and Dr. McLean.

Dr. Graves proposed an amendment to the constitution providing for life memberships in the club. This was referred to a committee consisting of Dr. Gleason, Mrs. Trelease, and Dr. Graves, to be reported back to the club at its next regular meeting.

Dr. Hazen proposed raising the subscription rate for the Torrey Bulletin from four dollars ($4.00) per year to six dollars ($6.00) per year to libraries and non-member subscribers. This motion was seconded by Dr. Harper and unanimously adopted.

Dr. P. A. Rydberg gave a detailed report of his botanizing trip in Kansas and Minnesota. He collected several new species from Kansas, including a new species of Prunus, a sand plum, with good edible fruit, and found some interesting Canadian plants in North Eastern Minnesota, on the Pigeon River. (A complete account of this trip will be published in the Journal of The New York Botanical Garden.)

Dr. Fred J. Seaver gave a brief account of the summer meeting of the Botanical Society of America held at Laramie, Wyoming, July 31-August 4, 1929, which he attended in company with Mr. Paul F. Shope and T. D. A. Cockerell of the University of Colorado. Arriving in Laramie at noon, July 31, the afternoon was spent in meeting incoming botanists and inspecting the buildings and grounds of the University. In the evening a banquet was held in the University dining hall and was well attended by visiting and local botanists. Professor Aven Nelson presided and T. D. A. Cockerell was the chief speaker of the evening.

On the next morning, after breakfast, cars were assembled and the entire delegation started for the University Camp, located in the Medicine Bow Mountains at an elevation of 9,600 feet and a distance of 40 miles from the University. Arriving there about noon an assembly was called immediately after luncheon at which plans for the meeting were discussed. Several sections had been arranged for but these simmered down to two. The mycologists and the pathologists combining under the leadership of Professor J. C. Gilman of Iowa and the geneticists and ecologists united with the taxonomic botanists under Dr. J. M. Greenman of the Missouri Botanic Garden. It was arranged to spend all the daylight time in the field, restricting meetings, which were entirely informal, to the evening. Brief talks were given by Professor Aven Nelson and a number of the visiting delegates.

The mycologists devoted considerable time to the collection of rusts and smuts and were very fortunate in having with them Professor A. O. Garrett of Salt Lake City, Utah, who is well known as a rust collector. Specimens were collected in quantity and will be arranged in a number of sets, one of which will be sent to each of the institutions represented on the trip.

On several occasions all the botanists combined and made

trips to points of general interest. One such expedition was made to Brooklyn Lake about six miles above the camp. Cars were driven as far as the Lake and the entire party walked completely around this body of water each one collecting the plants in which he was especially interested. On another occasion cars were driven as far as the roads permitted and a number of the delegation climbed to the crest of the mountains while others spent their time botanizing about the shores of Lake Marie.

On Sunday, August 4, camp was broken and the delegation returned to their respective homes. The meeting was a decided success and it was the unanimous opinion of all present that the summer outings should be continued.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

ERRATA

Due to a mixing of type after the proof was read there were a large number of errors on pages 38 to 41 of number 3.

Page 38, line 6 from top *Populus deltoides*
line 5 from bottom *Mimosa strigillosa*
39, first column line 18, after Typhaceae insert *Typha* sp.
22 *Eragrostis hypnoides*
31 *Paspalum dilatatum*
5 from bottom *Commelina nudiflora*
bottom line *Chenopodium ambrosioides*
second column, line 14 *Sesban exaltatus*
27 Epilobiaceae
7 from bottom *Heliotropium indicum*
40 first column, line 4 *Diodia*
14 *Populus deltoides*
27 *Panicum dichotomiflorum*
32 *Cyperus rotund s*
4 from bottom *Chenopodium ambrosioides*
3 from bottom *Chenopodium*

second column, line 12 *Mollugo*
17 *Mimosa strigillosa*
26 *Sida*
30 *Cardiospermum*
8 from bottom *Jussiaea leptocarpa* Nutt.
41, first column, line 5 *Ilysanthes*

Dates of Publication of Vol. 29 of Torreya

No. 1,	January-February	March 7, 1929
2	March-April	May 2
3	May-June	July 2
4	July-August	August 12
5	September-October	October 24
6	November-December	January 10

NEWS NOTES

Beginning with our January-February number we will publish a series of special interest to teachers of high school biology and botany. The following are some of the articles which have been promised: Ontogeny and Organization of the Plant Body, Dr. E. W. Sinnott; Sterilities, dichogamy, maple flowers, Dr. A. B. Stout; Breeding Cereals for Disease Resistance, Dr. G. M. Reed; Present Status of forest tree epidemics; Dr. A. H. Graves; Gladiolus as Class Room Material, Dr. F. T. McLean; Plants of my Back Yard, Dr. H. A. Gleason; Scientific Plant Breeding of Apples, Dr. R. C. Benedict; Incunabuli, Dr. C. Stuart Gager; Besides the articles referred to there will be others by Dr. R. A. Harper, Dr. Sam Trelease, Dr. B. O. Dodge and other botanists.

A. S. Hitchcock, custodian of grasses of the U. S. National Herbarium, has returned from Africa. He made large collections of grasses, especially in East Africa, where he states, conditions for collecting were the best he had ever encountered. (Science)

ARROW GRASS, POISONOUS TO LIVESTOCK, CONTAINS THE DEADLY HYDROCYANIC ACID

Hydrocyanic acid, one of the deadliest of poisons, exists in small quantities in arrow grass, *Triglochin maritima*, a

plant which has caused the death of many cattle in western Nebraska, Utah, Wyoming, and Nevada. In this country arrow grass, known also as goose grass and sour grass was first observed in salt marshes near the coast, but is also found in salty or alkaline spots near streams and lakes in the interior. This plant is the subject of a bulletin just issued by the U. S. Department of Agriculture, "Arrow Grass as a Stock Poisoning Plant," Technical Bulletin No. 113-T. The bulletin reviews previous mention of the plant as poisonous to livestock, describes the plant, and reports experiments in which it was fed to cattle and sheep in various amounts and in different stages of the plant, from fresh-cut leaves to cured hay.

Dr. E. D. Merrill, the new director of the New York Botanical Garden, has been appointed vice-president of the Fifth International Botanical Congress, which meets in Cambridge, England, this coming August.

Dr. Loren B. Smith, in charge of the government's research laboratory for the study of the Japanese beetle at Moorestown, N. J., claims that the increase numerically of the beetle has been permanently checked in the districts where it has been for the longest time. The beetle was first noted near Riverton, N. J. and the Department of Agriculture began war on it two years after its discovery here, in 1918. More than 250 species of plants are eaten by the beetle, but some 25 or 30 seem to be especially preferred. Among the preferred plants are apple, quince, pear, cherry, plum, grape, corn, soy bean, and some of the commonly planted shade trees. The checking of the increase of the beetle is due to the introduction of foreign parasites and the increase of factors of natural control.

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THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor, G. T. Hastings, 2587 Sedgwick Ave., New York when returning proof.

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